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RESEARCH ON THE DEVELOPMENTAL ORIGINS OF THE CHARACTERISTICS OF DISADVANTAGED CHILDREN IS NOT AS IMPORTANT FOR SCHOOL PEOPLE AS IS SCHOOL-BASED RESEARCH. SUCH STUDIES FOCUS ON A TASK ANALYSIS APPROACH WHICH WOULD MATCH THE CHARACTERISTICS OF A STUDENTS BEHAVIOR WITH INSTRUCTIONAL PROCEDURES. ONE SPECIFIC PIECE OF RESEARCH STUDIED THE EFFECTS OF SOCIAL CLASS AND ETHNIC GROUP INFLUENCES ON THE DEVELOPMENT OF LEVELS AND PATTERNS OF MENTAL ABILITY BY OBTAINING THE SCORES FOR VERBAL ABILITY, REASONING, NUMBER FACILITY, AND SPACE CONCEPTUALIZATION OF MIDDLE- AND LOWER-CLASS CHINESE, JEWISH, NEGRO, AND PUERTO RICAN FIRST GRADERS. THE EFFECTS OF ETHNICITY UPON THE MENTAL PATTERNS WERE THE MOST STRIKING FINDINGS, FOR THE PATTERNS WERE CLEARLY DIFFERENT AMONG ETHNIC GROUPS. WITHIN ETHNIC GROUPS SOCIAL CLASS DIFFERENCES AFFECTED ONLY LEVEL AND LEFT PATTERN UNCHANGED. SOCIAL CLASS WAS A MORE INFLUENTIAL FACTOR IN THE LEVEL OF ABILITY OF NEGROES THAN AMONG ANY OTHER GROUP. THESE FINDINGS SUGGEST FURTHER STUDIES OF (1) DIFFERENTIAL ETHNIC GROUP PATTERNS AS PREDICTORS OF ACHIEVEMENT, (2) THE STABILITY OF THESE PATTERNS, (3) THEIR DEVELOPMENTAL ANTECEDENTS, AND (4) APPROPRIATE TEACHING STRATEGIES. IN CONTRAST TO THE COLEMAN REPORT'S STRESS ON EQUAL EDUCATION TO PRODUCE EQUAL ACHIEVEMENT LEVELS AMONG ALL GROUPS, THE FINDINGS OF THIS STUDY SUGGEST THAT EMPHASIS ON EQUAL OPPORTUNITIES FOR EQUAL AND MAXIMUM DEVELOPMENT OF GROUPS WOULD BE MORE SUCCESSFUL POLICY. (NH)

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Learning Patterns in the Disadvantaged

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IV. Toward a New Definition of "Disadvantaged."

The first section of this paper is a general review of the evidence dealing with learning in disadvantaged children. We then discuss some directions for future research suggested by this review, followed by a specific case of research (past and future) with some implications for educational policy. We conclude with some thoughts on the definition of "disadvantaged."

I. General Review of Research.

A review of learning patterns in the disadvantaged faces the necessity of delimiting the key concepts. 1) Which population groups shall be included in the "disadvantaged?" 2) Which constructs or variables shall we consider as relevant indicators of learning?

For the reviewing function, which is the first purpose of this paper, we will follow the usual conventions regarding the delimitation of the disadvantaged or deprived population. Typically included in this rubric are children coming from families with low socio-economic status (as measured by occupation of the breadwinner, educational attainment of the parents, income, place of residence, etc.); children from minority groups (as determined by recent immigration of families from countries outside the United States or notable lack of acculturation of groups that may have been residents for generations) and minority racial status (in particular, Negroes and Indians who have been in caste-like status in this country for generations). Also included in this population are children from rural areas that have been isolated from the mainstream of American culture. (See Havighurst, 1964.) These definitions usually have in common the element of poverty or low income in relation to the median income of Americans.

The indicators of learning we have chosen to examine fall into four classes: intelligence and mental abilities, school achievement, laboratory learning, and expressions of cognitive development deriving from stage theory. Although these constructs vary in their clear-cut relevance to educational procedures and outcomes, we believe they all contribute some important insights into the learning patterns of the disadvantaged. We shall eventually judge these approaches in light of the power of the findings for improvement of the educational experiences and progress of disadvantaged learners.

A. General Intelligence:

The performance of children from low socio-economic status and minority groups on intelligence tests has been quite well documented. Studies of intelligence test performance and social-class status have provided the broad outlines of a picture which generally fits a deficit or less-than model. Mean differences between children of high SES and low SES have been consistently found when measures of intelligence are administered. These differences are unequivocally present at age four and have occasionally been demonstrated at younger ages (Bereiter, 1965; Gray and Klaus, 1965; Pasamanick and Knobloch, 1955; Bloom, 1964).

With increases in children's age, such intelligence test differences tend to increase. Thus, there are larger mean differences in intelligence between low and high SES children in adolescence than in the early years of school. This fanning out effect and the evidence to support it has been carefully reviewed by a number of workers (Bloom, 1964; Hunt, 1961; Silverman, 1965; Gordon, 1965; Davis, 1948; Karp and Sigel, 1965; Coleman, 1966).

The nature of the tests and conditions of administration have been an object of considerable study. The hallmark work of Eells and Davis (1951) on cultural biases in intelligence tests spurred a multitude of studies which demonstrated inadequacies in the tests themselves as good samples of general intelligence in diverse populations. Factors which might influence test performance such as rapport, speed, motivation and reward conditions were also studied (e.g. see Haggard, 1954). It appears clear now that Davis and his colleagues in their attempt to develop a culture-free measure of intelligence were accepting the idea that it was in fact possible to measure innate ability independent of cultural and experiential factors. They were assuming that it would be possible to tap the genotype of intelligence, and if properly done, intelligence would in fact be a fixed stable quantity (and one randomly distributed by social class.) See Charters, 1963.)

Partly through the failure of the Davis-Eells Games and through increasing evidence from other quarters, both the belief in fixed intelligence and the notion of ridding intelligence measurement of cultural contamination have been abandoned. Now, rather than rejecting cultural effects as contaminants, it is considered more appropriate to study them and take them into account in test construction and prediction. However, the notion of culture-fair testing has been widely accepted when the interest is in making comparative statements about groups. Thus, as is exemplified in the Lesser study of mental abilities, (Lesser, Fifer, Clark, 1965) items are based on a pool of experiences common to the subject population to be studied. Conditions of administration are arranged to minimize differences in rapport, motivation and prior experiences with testing when inter-group comparisons are being made. Further, validity and reliability must be established for the relevant population. An excellent review of factors to be considered in testing minority groups is available (Deutsch et al., 1964).

The most important outgrowth of the work in the 1950's is changed conception of intelligence. Only a few hearty souls will now maintain that intelligence tests measure something innate, fixed and pre-determined. (Hunt, 1961, reviews these ideas.) The validity of intelligence tests for predicting school achievement cannot be doubted, but the ability or aptitude, versus achievement distinction has been attenuated. Intelligence tests must now be thought of as samples of learning based on general experiences. A child's score may be thought of as an indication of the richness of the milieu in which he functions and the extent to which he has been able to profit from the milieu. In contradistinction, school achievement tests assume deliberate instruction oriented to the outcomes measured in the tests.

We have indicated that consistent differences on general intelligence tests are found when groups of children from varying SES backgrounds are compared. Some of the determinants of such differences were explored and a new understanding of the construct of intelligence was presented. It is important to realize that the procedures for test construction and administration now recognized as essential were not consistently followed in much past research on group comparisons. With this caution in mind, we continue our review of group comparison studies by turning to those which deal with racial and ethnic groups.

Differences in intelligence test performance have been found when Negroes and whites are compared. In general, Negroes are found to have lower tested intelligence than whites when compared within social class (Dreger and Miller, 1960; Deutsch and Brown, 1964), although the difficulties of measuring social status within the Negro population for comparisons with the white population have not been adequately overcome.

Studies of other minority groups, though not nearly as plentiful as those on Negro-white comparisons, generally indicate similar mean differences. (See Anastasi, 1958, Ch. 15 for a review.)

It should be remembered that the studies we have reviewed deal only with group differences using social class, ethnicity or both as classificatory variables. Although mean differences are found in favor of majority group and high SES children, the overlap in distributions is great. It is by now a truism that all disadvantaged children do not fall below their more advantaged peers on tested intelligence and mental abilities. The deficit model applies to groups only. Individual differences within groups must also be examined.

A number of recent studies have attempted to locate and study children of disadvantaged origins who in fact are superior to the normative status of the disadvantaged. The work of Karnes (1965) and Mackler (1966) and McCabe (1964) typify these studies. These researchers are attempting to characterize successful children and to study environmental factors which may account for success in disadvantaged children. The ability of these workers to locate children who test above average on intelligence tests and who perform above grade level on achievement tests is witness to the overlap in populations of advantaged and disadvantaged children. However, it should be noted that the criteria on intelligence tests for "gifted" is typically lower than that employed with a middle-class population.

B. Diverse Mental Abilities:

Early research in sub-cultural differences attempted to demonstrate that minority-majority group differences were attributable to the verbal nature of most general intelligence tests. The results from investigations which utilized tests of a less verbal character is equivocal (Higgins and Sivers, 1958; Fowler, 1957; Stablein *et al.*, 1961; MacCarthur and Elley, 1963). The most adequate conclusion for the moment seems to be that although group differences may be reduced somewhat by eliminating verbal components from the tests, other factors such as experiential differences, attitudes toward test taking and speed still affect test performance. And for certain groups such as Negroes, eliminating verbal items results in lower performance levels.

Coleman (1966), as part of a massive survey on equality of educational opportunity in this country, administered a verbal and non-verbal (reasoning) measure to first graders of various backgrounds. These tests were administered at the beginning of the school year. He found that children of low social status and children from minority groups (Negroes, Mexican-Americans, Puerto Ricans and American Indians) start school at grade one with mean scores on verbal and non-verbal tests of general ability that are below the national white average. The only exception to this general finding is that Oriental children score at the national average on the verbal measure at grade one and above the average on the non-verbal measure. In addition, the American Indian group sampled score at the national average on the non-verbal measure at grade one.

Aside from comparisons of verbal and non-verbal abilities, little in the way of study of other mental abilities has been systematically undertaken. Especially vacuous is such information with young subject populations. One exception is the work of Lesser, Fifer and Clark (1965) who have studied four mental abilities (Verbal, Reasoning, Number and Space) in first grade children. They compared performance of four sub-cultural groups (Negroes, Jews, Puerto Ricans and Chinese) of high and low social status, studying both organization of these abilities (patterns) as well as level of performance. This study will be described in greater detail later in this paper; it speaks to a much-needed area of investigation.

The organization of mental abilities in disadvantaged groups as studied through factor analysis has received relatively little attention. Recent work by Lovinger _et al_. (1966) with junior high school students, and Semler and Iscoe (1966) with elementary school children make an important contribution. Lovinger found that a factor analysis of the WISC responses of Negro lower-class seventh graders produced a factor structure which was congruent with that found for the normative group (Cohen, 1959), although level of performance on the WISC was considerably lower for his population and subtest scores were also variable. Semler and Iscoe (1966) administered the WISC and Progressive Matrices to white and Negro children from seven to nine years of age. They found sufficient incongruity in the intercorrelations of the WISC subtests by race to warrant separate factor analyses. Intercorrelations among the Progressive Matrices subtests, however, were highly similar for both groups.

It should be clear from this review, that much data is available for purposes of comparing social class groups on tests of general intelligence. However, even when one wants to make more detailed analyses either by minority group membership or on particular mental abilities the data become sparse. In addition, data on the organization of mental abilities within sub-groups is just becoming available. Testing of the same samples on a number of mental abilities (such as the PMA) has only been done occasionally (Havighurst and Breese, 1947; Havighurst and Janke, 1944; Lesser _et al_., 1965).

C. _School Achievement_:

We turn now to studies of school achievement in disadvantaged groups. Massive amounts of data are now available on a national sample of children at grades one, three, six, nine and twelve in regard to school achievement (Coleman, 1966). The findings from this study are consistent with earlier ones dealing with the school achievement of disadvantaged children. In the Coleman survey in addition to a general verbal and non-verbal measure at each grade level, reading and mathematics achievement were assessed at all grades starting at grade 3 and a General Information test was administered at grades nine and twelve.

As indicated in the last section, most groups of minority children and those of low SES score below the national average on verbal and non-verbal tests at the beginning of their school careers (Coleman, 1966). In addition, readiness tests* administered to children at the kindergarten level have also found indications of social class and racial differences in readiness, in favor of majority group and high SES groups. This has been demonstrated with reading readiness (Brazziel and Terrell, 1962) and arithmetic readiness (Montague, 1964).

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*The readiness tests, as opposed to the general ability tests, are more specifically oriented to learnings necessary for successful achievement of a school subject e.g. reading. In fact, predictive validities of the two types of tests do not differ appreciably.

Rather than witnessing a narrowing of the differences as children proceed through school, the Coleman (1966) findings reveal that minority group children (with the Orientals excepted at grade 3) perform below the national average at all grade levels on all measures. The relative standing of these groups in relation to the white population remains essentially constant in terms of standard deviations, but the absolute differences in terms of grade level discrepancies increases. This increase in the number of grade levels behind the normative population is what is commonly referred to as the "cumulative deficit" (Deutsch, 1960).

Contrary to what might have been expected regarding the differentials in mathematics and reading achievement, the absolute grade level difference (compared to the average white group) in achievement in mathematics at grade twelve for all groups except the Orientals is greater than for reading comprehension (Coleman, 1966).

The Coleman survey is cross-sectional. There are a few longitudinal studies of achievement in the literature which reflect essentially the same pattern: as disadvantaged children move through the current school system their achievement in grade levels as compared to the normative population becomes increasingly discrepant and low (Osborne, 1960).

The picture of educational disadvantage which emerges when examining achievement data is a clear indication of the failure of the school systems.

When intelligence test data and early achievement data are combined, we have a predictor's paradise, but an abysmal prognosis for most children who enter the school system from disadvantaged backgrounds. At the very least this ability to predict school failure should be better exploited by the schools in an effort to remediate the situation. Payne (1963) has demonstrated that by the end of grade one, over two-thirds of the children who will be failing in arithmetic in grade six can be identified using socio-economic data, intelligence test scores and an arithmetic achievement test. This provides the school not with group tendencies but with individual tagging of children for whom the usual curriculum will surely fail. It also provides five years of lead time to remedy the situation.

Taken together, the data on general intelligence, mental abilities and school achievement all give indications that general learning first in the home and community and later within the school as well is clearly associated with disadvantaged status. The level of such learning is generally lower for children of most minority groups and children of low socio-economic status. Important variations in patterning of such learnings has yet to be studied systematically with a few notable exceptions. Even in the school achievement area, data regarding progress in school subjects other than reading and mathematics is not readily available. It can perhaps be safely assumed that achievement in social studies, science, and other academic areas will be highly correlated with achievement in reading and arithmetic. Studies of performance of disadvantaged children in these areas should be carried out, however.

D. Laboratory Learning:

There are only a few studies which have used laboratory learning paradigms to compare performance of children from different social and cultural backgrounds. As Jensen (1967a) has pointed out, it is somewhat inconsistent with the traditions of the learning laboratory to introduce examinations of individual difference variables. Thus, Subjects X Independent Variables interactions are usually considered to contribute to error variance (Jensen, 1967a, p. 117).

Semler and Iscoe (1963) compared the performance of Negro and white children on four conditions of paired associate learning tasks; they also obtained WISC's on the children who ranged in age from five to nine years. Although significant differences on the WISC were present, overall racial differences in paired-associate learning were not found. Correlations between IQ and learning task scores were low for both groups (.094 for whites, .189 for Negroes).

Zigler and DeLabry (1962) compared groups of middle-class, lower-class and retarded subjects on a concept switching task using different reward conditions. They found that when each group performed under the reward condition considered optimal, there were no group differences in performance. The intangible reward condition was considered optimal for the middle class, tangible reinforcement was optimal for the lower-class group and the retardates. A similar study using a discrimination task was carried out by Terrell, Durkin and Wiesley (1959). They also found material reward produced better performance in lower-class children and non-material reward proved more effective with middle-class children.

Rohwer (1966), Jensen (1961) and Rapier (1966) have found that performance of lower- and middle-class Negroes, Mexican-American and Anglo-Americans, and lower- and middle-class Caucasians, respectively, does not differ markedly in laboratory learning tasks such as selective trial and error learning and paired-associate learning. These workers find that the relationship between tested intelligence and performance on the learning tasks is high for the upper-status groups but negligible for the lower-status groups. Jensen (1967b) suggests that the equivalence of performance of the lower-status children with middle-class children on these tasks which do not require transfer from previous learning suggests that the learning ability of children from lower-status backgrounds is not adequately reflected in general intelligence tests. Taken together with the findings of high correlations on these learning tasks and intelligence tests for upper-status groups, and low correlations for low status groups, he argues that research is needed to clarify the reasons for these unique relationships which probably reflect that intelligence tests are "truer" estimates of ability for the middle-class groups than for the lower class.

Whether one wishes to join Jensen in his search for more accurate measurements of ability in low status populations -- it is admittedly reminiscent of the quest for culture free measurement -- his findings and those of his colleagues suggest the relevance of combining differential psychology with the tools of the learning laboratory. Fruitful exchange of knowledge may be possible and help to edify the learning patterns of the disadvantaged.

Along these lines, some recent factor analytic studies have been carried out with measures of various abilities and measures of learning on laboratory tasks. Illustrative of this work is a study by Duncanson (1966) who administered concept formation, paired associates and rote memory tasks to sixth grade students along with a number of tests from the Reference Tests for Cognitive Factors, the Kuhlman-Anderson and some of the Stanford Achievement Battery. The socio-economic level of the students sampled is not specified in this study. However, the factor analysis carried out on these data did show common variance between certain ability tests and the laboratory tasks with the exception of the concept formation tasks. In addition there were unique learning task factors. Factor analytic studies such as this one should help clarify the nature of learning task performance and ability measurements on populations of different ages and backgrounds.

E. Other Studies of Cognitive Development:

It remains to review other studies which deal with cognitive functioning but come from traditions other than the psychometric or learning laboratory. One such dimension of cognitive functioning is classificatory behavior. Classificatory behavior has often been considered a language function and has been studied along with other linguistic behaviors. Although we have not reviewed language studies in the disadvantaged, this particular aspect of functioning can be seen as exemplary of linguistic or cognitive functioning. John (1963) asked children to sort pictures of common objects and to label the piles they created; she studied first and fifth grade Negro children of varying social class. She found that children at the fifth grade level of lower-class status made more piles and gave fewer verbalizations about their sorting than middle-class children.

Hess and Shipman (1965) in presenting the Sigel Sorting Task to four year old Negro children of varying social class also found that level of abstraction was related to social class in the children, although the number of unscorable responses was extremely high for all children of this age.

Although child psychologists are showing increasing interest in the work of Piaget, few studies from a stage theoretic point of view have been executed with children from disadvantaged backgrounds. In one study a sorting task (using human and animal dolls) and a class inclusion task were administered to part of the Hess and Shipman (1963) sample when they attained age five. The tasks had been developed by Kohlberg (1965) and patterns of responses had been found to form a Guttman scale reflecting a Piaget-based developmental sequence in a middle-class sample of children. The developmental sequence was found to exist within this Negro population of mixed social class; that is, the Guttman scale was reproduced. Further, there were differences by social class in the developmental level attained, with the upper-middle-class group being more advanced developmentally. (Stodolsky, 1965).

Deutsche (1943) in a study of children's concepts of causal relations based on a Piagetian theory compared children in grades three through eight who came from different social class backgrounds. She found no consistent differences by social class in the developmental level of children's responses to her assessments of causal relations.

Wallach (1963) reports studies by Hyde and Slater dealing with conservation of number in samples of children of differing social background.

Wallach reports that these researchers have found variations in age norms in differing social groups but no indication of discrepancies in developmental sequences.

From the limited evidence to date it appears reasonable to expect that the stage theory of Piaget is generally applicable to all children regardless of social-class background. Longitudinal studies and studies at older ages would seem particularly important. The studies which have found developmental sequence to apply to diverse samples of children have been with young children. It is still not known how much of the developmental sequence is general. Thus, we might find truncated developmental sequence if we tested children of disadvantaged background in adolescence. In other words, such children might display sequence to a point, but the stage of development reached might be less developed than that achieved by their advantaged peers. Such studies should be considerably aided by the availability of standard testing techniques (Laurendeau and Pinard, 1962).

F. A Note on Testing:

The types of achievement and intelligence tests which are most often used can only have limited value in describing the cognitive functioning of children. In almost all instances we are concerned with scratchings on an answer sheet not with the ways in which a student arrived at a conclusion. No matter how much we may think we know by looking at scores on such psychometric procedures, unless they are constructed to reveal reasoning processes we simply won't get at them. Zigler (1966) in discussing mental retardation, points out this content versus process distinction. He makes a plea for testing procedures which give us information about the "cognitive structures and processes that give rise to content" (p. 113).

Historically, there has been some incompatability between test constructionists working within the measurement tradition and those psychologists interested in cognitive processes. There does not seem to be any necessary reason for this. The testing procedures developed by Smedslund (1963), Laurendeau and Pinard (1962) and a new series developed by E.T.S., "Let's Look at First Graders" are procedures which allow statements about individual differences and also provide information about cognitive processes of children. These tests are outgrowths of Piaget's theories of cognitive development.

As another example, within the achievement testing domain, more use could be made of alternative responses to problems. If multiple choice stems consisted of errors reflecting common difficulties encountered in problem solution, then analysis of all student responses would give the teacher diagnostic information. The "wrong" answers would contain within them important information about the student's path of problem solution.

II. New Directions for Research.

Although the above review of recent studies relating to learning in the disadvantaged does not pretend to be totally comprehensive, the relative emphases in prior research is likely to be veridical. Using the review as a base we will now explore the directions for new research in this area which we believe to be most necessary. There are at least two major orientations which research on the learning of disadvantaged students can take. Both seem important, but have different pay-offs in terms of relevance to educational procedure and outcomes.

A. Developmental Origins:

The first direction which can be charted is an explanatory, developmental one. This type of research would be oriented to tracing the origins of the characteristics which have been observed in the disadvantaged, as well as charting the etiology of characteristics not studied to date.

If we begin with a broad description of the relation between a characteristic such as general intelligence and social class status a series of questions can be asked. Most broadly, how can we account for the observed differences in performance among these groups? What does it mean in psychological process terms to be a member of a given social class? In order to answer this question one moves quickly to variables which are more detailed and which should explain within class variations as well as between class variation.

A start in this research direction has been made in a number of quarters. Milner (1951) assessed parent-child relations and certain attributes of the home environment in relation to reading readiness. She used interview procedures in her study of first-grade children and their parents. More recently, Davé (1963) and Wolf (1965) related indices of home environment to school achievement and intelligence test scores, respectively, in a fifth-grade white population of varying social class. These workers began by conceptualizing the home in terms of environmental process variables believed to be salient for the development of the outcome measures in which they were interested. They also used interviews to assess these environmental characteristics. They rated such characteristics as press for achievement, language models in the home, academic guidance provided by the home and provisions for general learning. The ratings which they derived on the environmental process variables were then correlated with children's performance. Davé found a multiple correlation of .80 between his environmental indices and overall achievement on a standard test battery. Wolf achieved a multiple correlation of .69 between his ratings and intelligence test performance.

From the point of view of prediction, these correlations represented a considerable advance over the usual relationship found between social class and achievement or intelligence test performance. More important, however, is the direction in which they orient future research. It is clearly demonstrated that one can move beyond gross classificatory variables such as social class to much more detailed assessment of environments. Although these studies are correlational, they move us conceptually in the direction of experimental studies of development by viewing environmental variables in dynamic, process-oriented terms.

A study reported by Peterson and DeBord (1966) investigated various home factors and their relation to achievement in eleven-year-old Negro and white lower-class boys in a southern city. Using interview procedures they assessed family composition, economic and social stability of the family, social participation, cultural level of the home, educational press, and certain aspects of the parent's orientation to the world. Peterson and DeBord ran separate multiple regressions on their data by race. For both groups they achieved high multiple correlations between certain home variables and achievement: multiple correlation for Negroes was .82 using eleven variables regressed on achievement scores; the comparable correlation for whites was .75 using fourteen home variables. Although there were certain variables which were significantly correlated for both the Negroes and whites others were unique for each group. The fact that such multiple correlations were obtained within a lower-class sample indicates the extent to which home conditions vary within social-class groups.

Another important step in this direction is the research of Hess and Shipman (1965). In an extensive project studying Negro pre-school children, they have assessed numerous maternal characteristics including language (Olim, Hess and Shipman, 1965) and maternal teaching style (Jackson, Hess and Shipman, 1965). Maternal teaching style is assessed in an experimental interaction session in the laboratory in which the mother is instructed in a simple task and then instructs her child. All interactions, both verbal and physical, are recorded and later analyzed into a number of dimensions. Olim, Hess and Shipman report that maternal language is a better predictor of child's abstraction score on a sorting task than either the mother's IQ or the child's IQ. Jackson, Hess and Shipman found that certain teaching variables were highly related to the learning outcome of the child in the experimental teaching situation. In addition, Stodolsky (1965) has extended these findings to predict child's vocabulary at age five using a combination of maternal language and teaching variables assessed when the child was four. Multiple correlations of these process variables and the child's language score was .68, very close to the theoretical limits taking into account the reliability of the vocabulary test. She found that the quality of the mother's own language, the mother's use of reinforcement in a teaching situation and the extent to which the mother made task-relevant discriminations in teaching a task were highly related to the child's vocabulary level.

The Hess and Shipman work posits that the mother's behavior, especially her linguistic and teaching behavior, is a key to the child's learning in the home. By drawing on learning theory and theories of language learning, they are able to point to relations between developments in the child and the mother's behavior which are both theoretically reasonable and have great heuristic power.

The Hess and Shipman study is clearly an advance in the direction of explaining the origins of cognitive abilities in young children. Their work is more embedded in natural observation than the interview studies previously cited, but still does not go the whole way in assessment of what actually takes place in the home.

It should be clear that it will eventually be necessary to execute detailed observational studies of children in home environments if one wants to arrive at valid hypotheses about the dynamics of development in interaction with environment. The dearth of naturalistic data about children's behavior and concomitant environmental circumstances is most regrettable. Some attempts are now being made to remedy this situation at Harvard in the form of the Pre-School Project under the general direction of Burton White. This Project is planned as a long term study of pre-school children in home and school environments to trace the development of various abilities which promote educability. We are beginning with first-hand observations of children and environments. Eventually, we shall generate ideas about developmental regularities which will be tested through longitudinal studies of children from birth through six years of age. In addition we shall generate hypotheses regarding environmental factors which interact in important ways with the developmental phenomena we isolate. In the long run these hypotheses will be subject to experimental test through manipulations of environmental conditions.

In order to extend our knowledge of the development of intellectual abilities and learning in children, we will need more investment in longitudinal studies which chart the course of growth within individuals. Such studies should be accompanied by investigations of relevant environmental circumstances. The longitudinal work of Birch and his colleagues on the development of personality and temperamental characteristics in infants and young children is illustrative of the power of this approach.

The types of studies we are suggesting here clearly need not be restricted to disadvantaged populations. It is to be hoped that such researchers would include children of diverse backgrounds. From a methodological point of view, variations in environmental circumstances and variation in child characteristics would be less restricted by studying a wide range of children. On the other hand, it is altogether possible that circumstances which are relevant in one sub-cultural context would not generalize across sub-cultures.

Is this kind of research high priority for school people? In many ways, we think not. We think we should assume for the moment that the job of the schools is a limited one (however arduous and complex). Children are sent to schools for a limited part of their daily lives to learn certain knowledge and skills and ways of thinking which are considered essential for functioning in the society -- in the world of work, leisure, and as citizens. This may appear to be a reactionary position, but we do not think we can expect schools to be the major catalyst or change agent in the society. It is our opinion that a more ostrich-like approach to the learning of disadvantaged students might have salutory effects.

Is it, after all, of prime importance for the teacher to know that a given child's intelligence test performance has been influenced by his mother's language, family values toward learning and so on? What is the teacher to do with this information? Will she find out the ingredients of such behaviors in parents of successful children, and imitate them? Surely school people can do better than that! This point is not hypothetical. Much of the design of pre-school compensatory programs for example has been quite directly oriented to reproducing the conditions of the middle-class home.

If school people want to take on the job of changing home conditions, for example, changing parent-child interactions in the home, then such information becomes more relevant. But we should also like to suggest that such home-based interventions will probably not be sufficient. Let us remember that life styles are usually quite adaptive to life circumstances (Lewis, 1961). We are not suggesting that it is impossible to achieve some modification of parental behaviors to facilitate the educational progress of students, but we would probably be a lot more successful if we were to modify the conditions which probably lead to many of these behaviors: namely, lack of money and access to jobs.

Now perhaps we are talking about politically-based action research! But while we are keeping psychologists and anthropologists busy studying the characteristics of people who are poor, might it not also be advisable to assess the degree to which these characteristics are situation-dependent? We are suggesting here a rather simple experiment which seems very important. Would poor people, given jobs and money, change in their behaviors relevant to the child's educability? Would parental behaviors such as cognitive level, teaching style, values and attitudes change with a change in economic conditions? We do not know -- but we think the matter bears empirical investigation.

By pursuing this line, which may be considered a flight into fantasy, (but c.f. Moynihan, in press) we do not mean to denegate research on the processes of development in disadvantaged children. We are suggesting that heavy investment in investigations of conditions which are modifiable through political and economic actions should be tempered by knowledge of the outcomes of such changes. Further, we suggest that the type of research which is both legitimate and important for developmental psychologists is not the most direct route to solving the educational problems which the schools have to tackle right now.

B. School-Based Research:

We should like to turn now to a much more straightforward and conservative approach to the learning problems of disadvantaged children. The schools have a job to do. Ask any teacher, she knows what she is to "cover" in a term. How can researchers assist teachers in doing this job better?

First, one assumption must be made explicit. Most, if not all, teachers want to teach effectively and to see their students learn. We do not believe the cumulative deficit in achievement of disadvantaged students reflects any willful or determined attempts on the part of teachers to "keep these students down." Nor do we think it reflects laziness. The most parsimonious assumption would seem to be that teachers are not effective and students are not learning at an adequate rate because techniques have not been devised which produce desired learning outcomes in many children whom we label disadvantaged.

What can researchers do to help change this situation? One strategy would be to start where the teacher has to start: with a curriculum to be taught and a group of students who are to learn it. Two broad questions can be asked: What does it take in the way of student behaviors and attributes to begin the prescribed learning task? 2) How does the student's current state match these requirements?

I am suggesting here that we formalize that process which typically goes on in a teacher's mind. The teacher attempts at some level to analyze the objective she wants her student to achieve into a logical sequence of learnings. She concomitantly assesses the state of readiness of the student in terms of prior learnings and behaviors which seem relevant to the learning task at hand. She then devises an instructional strategy which takes both curricular and student facts into account. We are talking here about the old-fashioned process of diagnostically-based instruction.

It seems that we could dramatically effect the educational progress of all students if a large investment were made along these lines. The idea though simple to state, would be extremely laborious to execute. What would be needed first would be detailed analyses of tasks or objectives expressed in behavioral terms. We know of two groups who have attempted such work to date. Gagné (1966) describes a number of such analyses of cumulative learning in mathematics. For example, he attempts to analyze the task of learning to "add integers" into a hierarchical sequence of learnings which begins with the least complex learnings (associations) and proceeds in hierarchical fashion to the learning of simple and complex rules and principles. The task analysis which begins as a logical one can then be verified in part in the actual performance of students. He has found that learning to add integers does in fact follow the hierarchical sequence he proposed; that is, students who learn higher level tasks have achieved the lower levels. Children who have not mastered the lower level tasks in the hierarchy do not learn the higher level tasks.

This type of task analysis provides sequencing for the instructional program and diagnostic power. Such analyses since they are made in behavioral terms could be readily translated into quick testing procedures to assess a student's readiness for learning a given task. Such testing would immediately orient the teacher to that part of the instructional sequence to begin with a student.

Another example of this type of work is provided by Smilansky (1964). Their interest was in the development of a kindergarten curriculum which would provide disadvantaged Israeli children with the necessary skills and behaviors to enter the first-grade curriculum. The approach they used was to begin with first-hand observations of successful first-grade children in classrooms. They analyzed the behaviors required of the students in these classrooms, compiling a long list. They then constructed assessment techniques which would give evidence about these behaviors in five-year-old children. Simultaneously, they started to develop curricular approaches which would develop these behaviors in children who had not achieved them. The final success of their intervention program will be judged in terms of the achievement of these objectives in disadvantaged children.

Both the Gagné and Smilansky approach result in very detailed statements of behavioral requirements for a learning task. They do not specify how the teacher would proceed in the instructional program but they do pinpoint where to begin. In addition, the effort invested in the logical analysis of the task requirements, or the actual observation of children achieving tasks, is highly suggestive of instructional strategies.

A heavy investment in such analyses of curriculum, and the development of diagnostic techniques which are curriculum specific could make high-value information readily available to the teacher.

The task analysis approaches we have described should serve as first steps in an iterative matching strategy. One begins with a set of behavioral characteristics which fit a learning task. Students are assessed to see which behaviors and prerequisite skills they display. Then an instructional procedure is adapted for the student. The process is iterative as we can anticipate continuous refinements of both the assessments of students and the instructional procedures in the context of a given task. In addition, the process should be a continuous one, applying to each new task as it is reached.

The matching of instructional procedures to student characteristics could take at least two forms. One would be essentially remedial. That is, an instructional method would be settled on in advance that would be considered suitable for all students. Therefore only one set of prerequisite skills would have to be achieved by all students. After assessment of students, the teacher's first job would be to bring all students to this one configuration of necessary minimal skills before proceeding with the pre-selected regimen. Although this remedial strategy would clearly improve much current practice as there often is only one instructional method sanctioned by a school system, it is not the most desirable approach.

The second approach would make use of multiple instructional methods. Certain initial patterns of skills and learnings would be associated with certain instructional procedures. Optimal matching of students to curricular approaches could then be executed on the basis of initial assessments. Such matching would be far more diagnostic and precise than the usual sorts of tracking which goes on in the schools. School tracking, at least in the early years, is usually based entirely on level of student ability. Under such a procedure student characteristics are not meaningfully articulated with curricular contents or requirements. The real power of the matching procedure we are suggesting would be in the extent to which alternative instructional strategies could be generated which were based on a complex analysis of student characteristics and curricular contents.

The research program we are suggesting would be a tedious one. First a large-scale investment in curricular analyses would be necessary. Once such analyses were completed, an enormous effort would have to be expended in the development of diagnostic methods which could be used effectively by teachers. Some of these methods might be widely useful whereas others might be very specific to a given school or classroom.

Let us take an example. A key area in the elementary school curriculum is beginning reading. At the present time there are a number of major approaches to the teaching of beginning reading. Considering the "pure" types for a moment we can list the phonics approach, the experience chart method, the look and say approach and the linguistics approach. In order for a child to begin any of these methods, certain common minimal skills are probably necessary, but in addition particular kinds of prerequisites are attached to each method. For all methods we could probably list: being able to follow simple directions, being able to attend to a lesson, certain minimal visual discrimination, minimal language comprehension, and a rudimentary understanding of what a symbol system is. Additional prerequisites may be attached to each method. For the phonics method, a certain level of sound discrimination may be required. For the look and say method, more in the way of short term memory for forms may be required. The experience chart method may require a certain willingness and ability to communicate an idea to an adult.

This analysis is hypothetical. Only observation and assessment would reveal the cutting points on various abilities and the patterns of prerequisite learnings which would be necessary for the beginning acts of learning to read. Such an analysis would take us systematically to a much sounder choice of methods for a given child. Since the analysis incorporates feedback, it would in all probability generate both new methods and combinations of the old.

Once this approach begins it would feed into a deeper understanding of the conditions of learning which are appropriate for children with various characteristics. It is to be hoped that it would lead to much more pointed learning experiments in which children could be selected on the basis of a wide variety of characteristics.

Extension of test construction from the point of view of the psychologist (such as in the Lesser work) should also contribute to this approach. Although it appears most efficient to start building diagnostic tools on the basis of curricular approaches, theories of intellect should also lead to profitable constructs. Once the matching procedure gets started, it has built-in corrective features. Analysis of curricular approaches leading to diagnostic tools will lead in turn to new insights into student performance and curriculum. The beginning point is not crucial as long as the process gets under way.

We have proposed a program of school-based research which we believe would enormously assist the work of teachers on a day to day basis. Most important it should have great value in creating more successful students because it recognizes the background they bring with them.

III. A Specific Case of Research: Development of Mental Abilities of Children from Different Social-Class and Ethnic Groups.

We have presented to this point a general review of research on learning patterns in the disadvantaged and directions for new research suggested by this review. We turn now to a specific case of research on learning patterns in the disadvantaged, some future research suggested by this specific study, and, to some implications of the study for educational policy.

A. The Original Study:

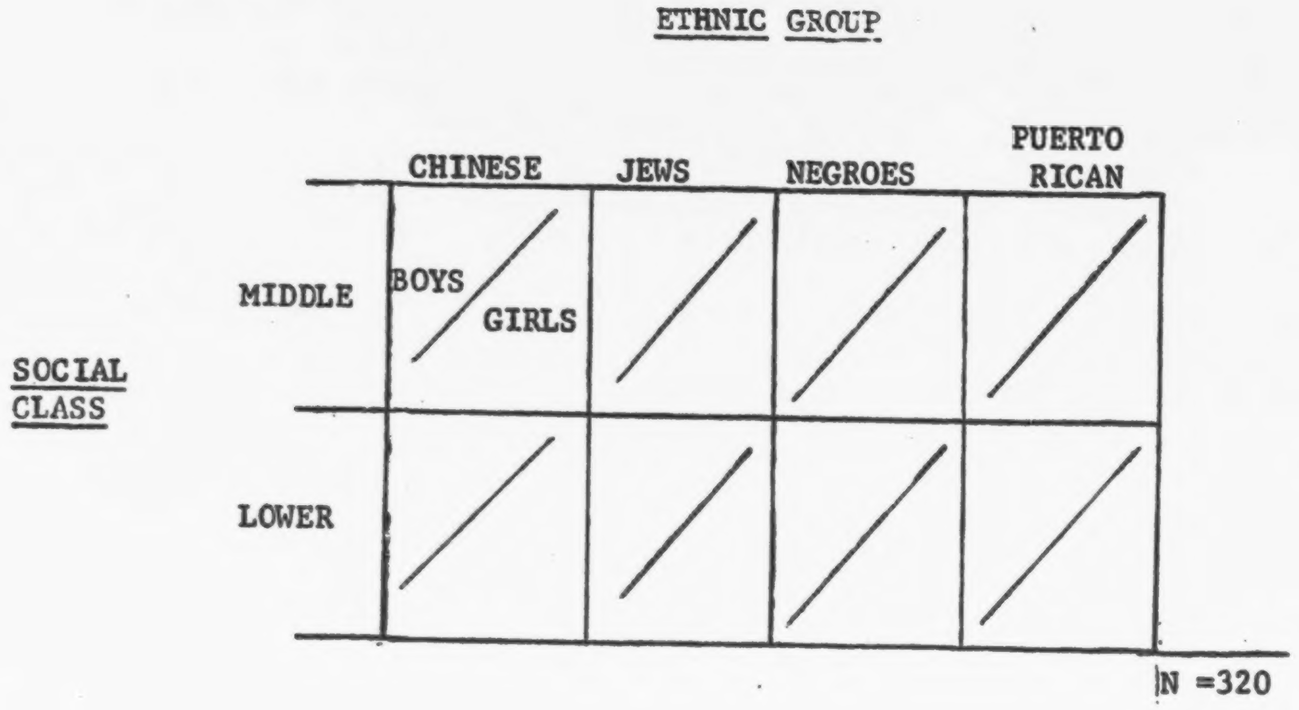
1. Aims:

Our goal is to examine the patterns among various mental abilities in six- and seven-year old children from different social-class and ethnic backgrounds. We accepted the definition of intelligence which postulates diverse mental abilities and proposes that intelligent behavior can be manifested in a wide variety of forms, with each individual displaying certain areas of intellectual strength and other forms of intellectual weakness. This definition of intelligence provided a basic premise for this study: that social-class and ethnic influences differ not only in degree but in kind, with the consequence that different kinds of intellectual skills are fostered or hindered in different environments.

2. Design:

Hypotheses were tested regarding the effects of social-class and ethnic-group affiliation (and their interactions) upon both the level of each mental ability considered singly and the pattern among mental abilities considered in combination. Four mental abilities (Verbal ability, Reasoning, Number facility, and Space Conceptualization) were studied in first-grade children from four ethnic groups (Chinese, Jewish, Negro, and Puerto Rican). Each ethnic group was divided into two social-class components (middle and lower), each in turn being divided into equal numbers of boys and girls.

Thus, a 4 x 2 x 2 analysis-of-covariance design included a total of 16 subgroups, each composed of 20 children. A total sample of 320 first-grade children was drawn from 45 different elementary schools in New York City and its environs. Three test influences were controlled statistically: effort, responsiveness to the tester, and age of the subject.


ETHNIC GROUP
CHINESE
JEWS
NEGROES
PUERTO RICAN
SOCIAL CLASS
MIDDLE
LOWER
BOYS
GIRLS
N =320

3. Procedural Issues:

In this brief report, it is impossible to describe all the details of the procedures employed. However, since research on the intellectual performance of "disadvantaged" children does impose some unique demands upon the investigator, at least the following procedural issues should be mentioned here.

a. Gaining access to the schools:

Perhaps the most formidable problem was that of gaining the cooperation of school boards and school authorities for research on such a supposedly controversial issue. An honest approach by the researcher to the school authorities must contain the words "ethnic," "Negro," "Jewish," and "lower-class," and yet is is precisely these loaded words which arouse immediate anxiety and resistance in those who are authorized to permit or reject research in the schools. We believed that our objective of supplying information and understanding about the intellectual strengths and weaknesses of the children being taught in school would be a strong inducement to participation. Not so. Only enormous persistence and lengthy negotiation -- during which the researcher must agree to a succession of incapicitating constraints permits such research at all.

Surely there are serious problems of ethics in educational research. Researchers should be (and most often are) as scrupulous as school authorities in maintaining the conditions of consent and confidentiality which protect subjects from unwarranted intrusions of privacy. But the legitimate ethical issues of privacy and free inquiry are not those that block access to the schools -- the fear of controversy over racial issues seems to immobilize school authorities.

Beyond our own experiences in gaining access to the schools, numerous examples exist of how research on the disadvantaged is prevented or distorted by the decisions of school authorities. For example, in Coleman's (1966) study of Equality of Educational Opportunity, requested by the President and Congress of the United States, thirteen major cities refused to participate, often because comparisons among racial groups were being made (although reasons for refusal were rarely stated).

Later in this paper, we shall discuss several new directions for future research comparing "disadvantaged" and "non-disadvantaged" children. These suggestions will remain the mental exercises of the academics unless some reasonable policies can be developed by researchers and school authorities to provide honest access to the school children, their parents, and their teachers.

b. Locating social-class and ethnic-group samples:

An associated problem was to achieve an unambiguous definition and assessment of social-class and ethnic-group placement. Both variables are clearly multidimensional in character, and to define and measure the necessary components of each is a formidable task. Since members of each ethnic group were to be located in both lower- and middle-class categories, additional problems arose in attempting to maintain an equal degree of separation between the two social-class categories for each ethnic group.

Obtaining the data necessary to identify the social-class and ethnic-group placement of each child presented many practical problems. There were strong legal restrictions in New York State upon collecting the data necessary for social-class and ethnic identification -- and these restrictions are perhaps quite justified -- but since we were not allowed to ask parents or school authorities directly about education, or religion, or even occupation, we were forced to use information gathered indirectly through twenty-three different community agencies and four sources of Census and housing statistics. Among sources such as the New York City Regional Planning Association, the Commonwealth of Puerto Rico, the China Institute in America, the Demographic Study Committee of the Federation of Jewish Philanthropies, and the New York Daily News Advertising Department, our best single source of information was one of the largest advertising agencies in New York City, which has within its "Component Advertising Division" (which develops special marketing appeals for different ethnic groups) enormous deposits of information on the locations of the many cultural groups in New York City. There was little willingness, of course, to allow us to use these data, but after endless sitting-in and sheer pestering we were given access to this information. We could not possibly have completed this study without it.

c. Developing "culture-fair" test materials:

Perhaps the major technical problem was to insure the fact that observed differences among social-class and ethnic groups reside in the children and not in the test materials themselves (or in the definitions upon which the tests are based). To accomplish this, tests were constructed which presuppose only experiences that are common and familiar within all of the different social-class and ethnic groups in an urban area. We had no intention to "free" the test materials from cultural influence, but, rather the tests utilize elements which appear commonly in all cultural groups in New York City. If, for example, other Picture Vocabulary tests use pictures of xylophones or giraffes (which a middle-class child is more likely than a lower-class child to encounter in a picture book or in a zoo), we used pictures of buses, fire hydrants, lamp posts, garbage trucks, and police cars -- objects to which all urban children are exposed.

d. Controlling "examiner bias:"

Each child was tested by an examiner who shared the child's ethnic identity in order to maintain chances of establishing good rapport and to permit test administration in the child's primary language, or in English, or, more often, in the most effective combination of languages for the particular child. Thus, we had a Negro examiner, a Spanish-speaking Puerto Rican tester, a Yiddish-speaking Jewish tester, and three Chinese-speaking Chinese testers to accomodate the eight different Chinese dialects encountered among our Chinese children. Each tester had been trained beyond the Master's Degree level and each had extensive experience administering psychological tests, but the tendency of the testers to empathize with the children from their own cultural groups demanded careful control of the testing procedures to insure uniform test administration. This was accomplished by the use of extensive video-tape training experiences in which each examiner observed other testers and himself administer the test materials. The capability of video-tape to allow self-viewing and the repeated review of test sessions permitted the establishment of uniform test procedures.

4. Some Findings:

Hypotheses were tested regarding the influence of social class and ethnicity (and their interactions) upon the levels of the four mental-ability scores and upon the patterns among them. The results are summarized as follows:

Table 1

Summary of Results

Source of Influence	Effect upon Mental Abilities	
	Level	Pattern
Ethnicity	Highly Significant	Highly Significant
Social Class	Highly Significant	Nonsignificant
Social Class X Ethnicity	Significant	Nonsignificant

a. Distinctive ethnic-group differences:

Ethnic groups are markedly different both in the absolute level of each mental ability and in the pattern among these abilities. For example, with regard to the effects of ethnicity upon the level of each ability, Figure 1 shows that

a. on Verbal ability, Jewish children ranked first (being significantly better than all other ethnic groups), Negroes second and Chinese third (both being significantly better than Puerto Ricans), and Puerto Ricans fourth.

b. on Space Conceptualization, Chinese ranked first (being significantly better than Puerto Ricans and Negroes), Jews second, Puerto Ricans third, and Negroes fourth.

But the most striking results of this study concern the effects of ethnicity upon the patterns among the mental abilities. Figure 1 (and the associated analyses-of-variance for group patterns) shows that these patterns are different for each ethnic group. More important is the finding depicted in Figures 2-5. Ethnicity does affect the pattern of mental abilities and, once the pattern specific to the ethnic group emerges, social-class variations within the ethnic group do not alter this basic organization. For example, Figure 2 shows the mental-ability pattern peculiar to the Chinese children -- with the pattern displayed by the middle-class Chinese children duplicated at a lower level of performance by the lower-class Chinese children. Figure 3 shows the mental-ability pattern specific to the Jewish children -- with the pattern displayed by the middle-class Jewish children duplicated at a lower level of performance by the lower-class Jewish children. Parallel statements can be made for each ethnic group.

The failure of social-class conditions to transcend patterns of mental ability associated with ethnic influences was unexpected. Social-class influences have been described as superceding ethnic-group effects for such diverse phenomena as child-rearing practices, educational and occupational aspirations, achievement motivation, and anomia. The greater salience of social class over ethnic membership is reversed in the present findings on patterns of mental ability. Ethnicity has the primary effect upon the organization of mental abilities, and the organization is not modified further by social-class influences.

Many other findings are described in our full report of this original study (Lesser, Fifer, and Clark, 1965). Only a few additional findings will be mentioned here, either because they were prominent in our recent replication study or in our plans for future research.

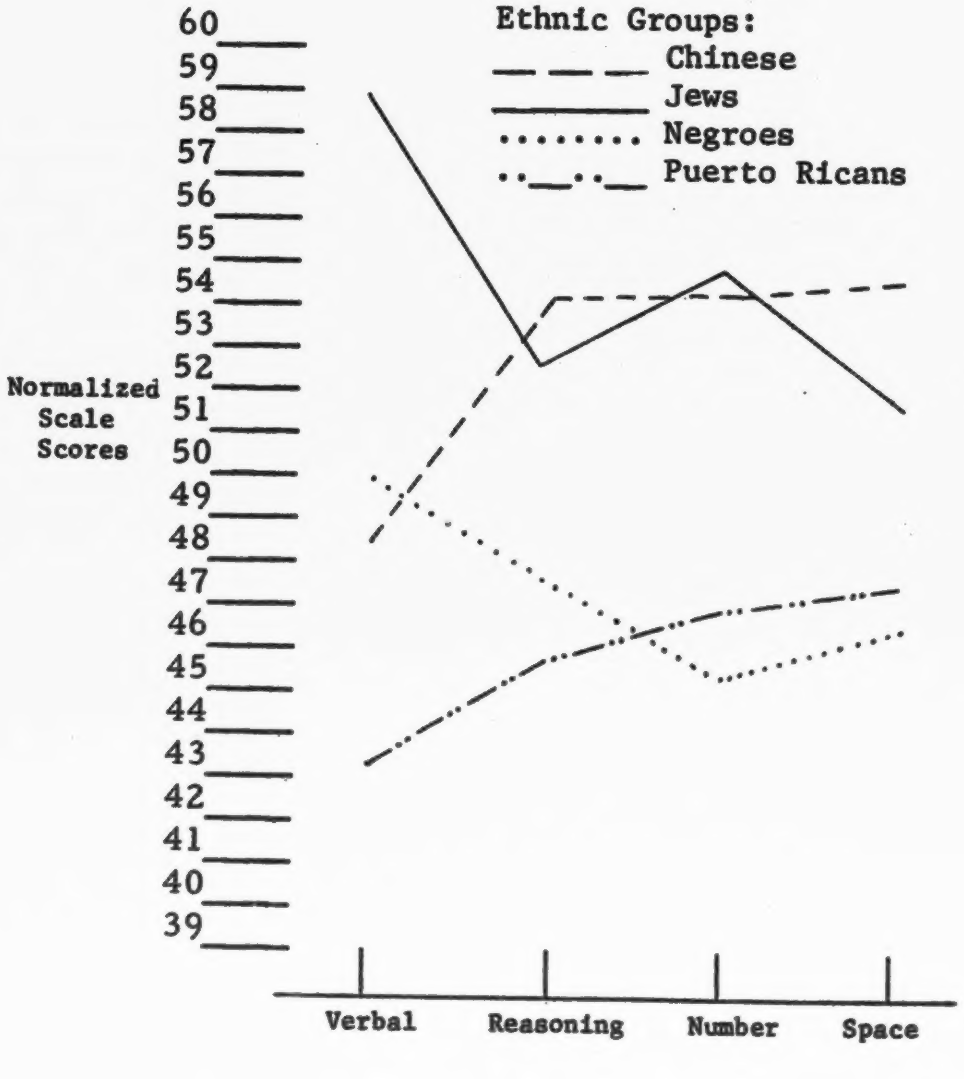


Figure 1.--Pattern of normalized mental-ability scores for each ethnic group.

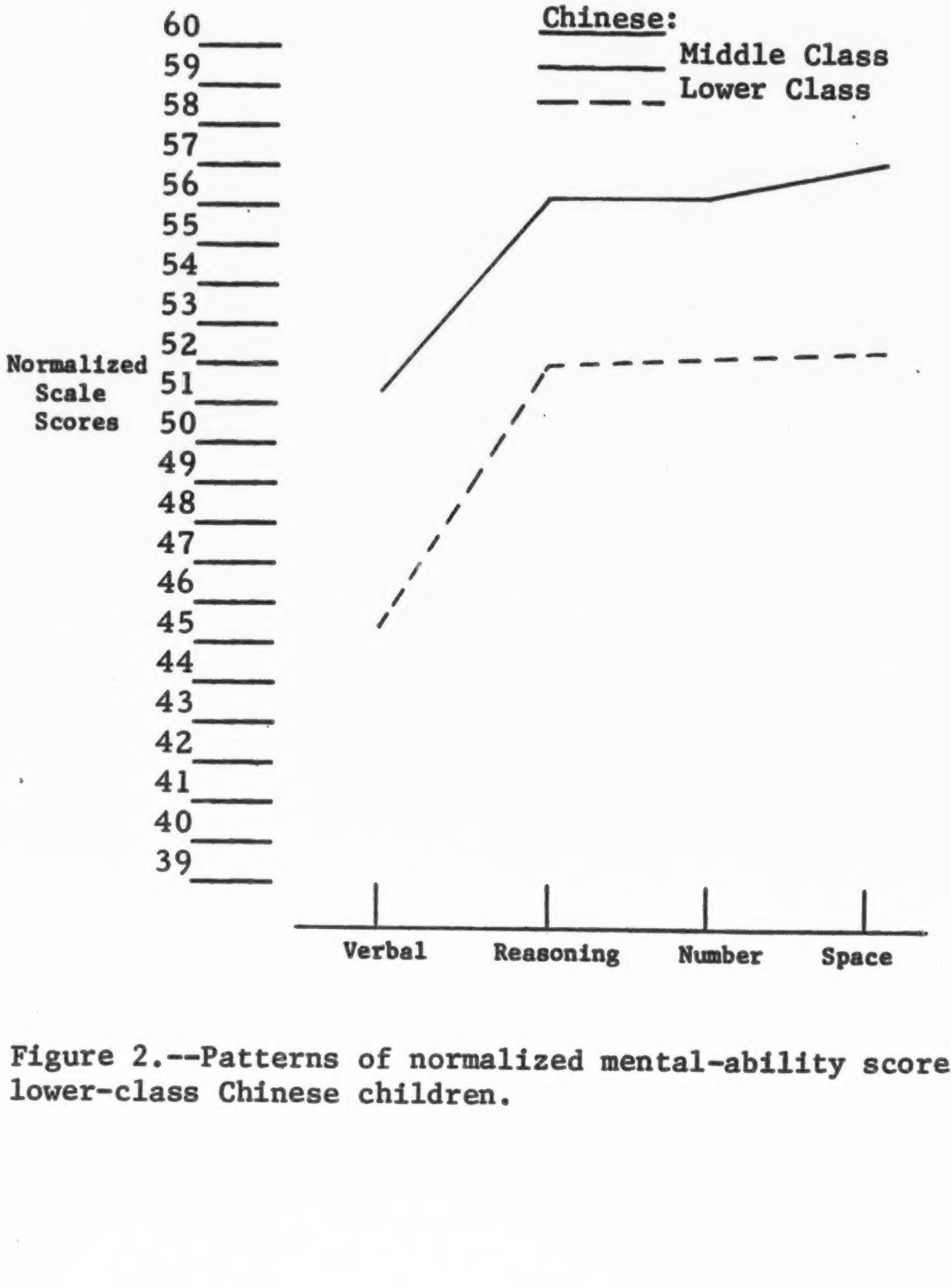


Figure 2.--Patterns of normalized mental-ability scores for middle- and lower-class Chinese children.

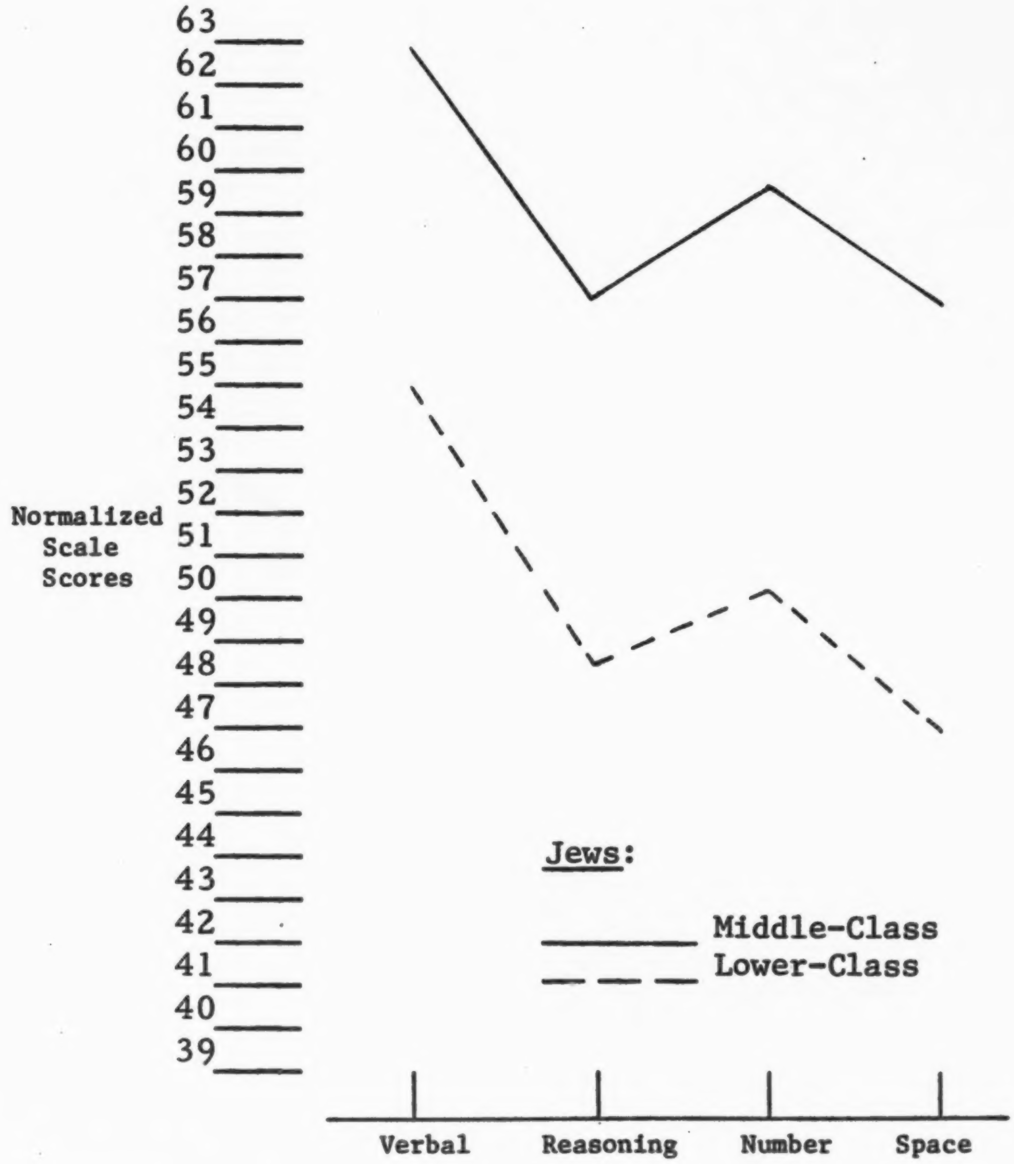


Figure 3.--Patterns of normalized mental-ability scores for middle- and lower-class Jewish children.

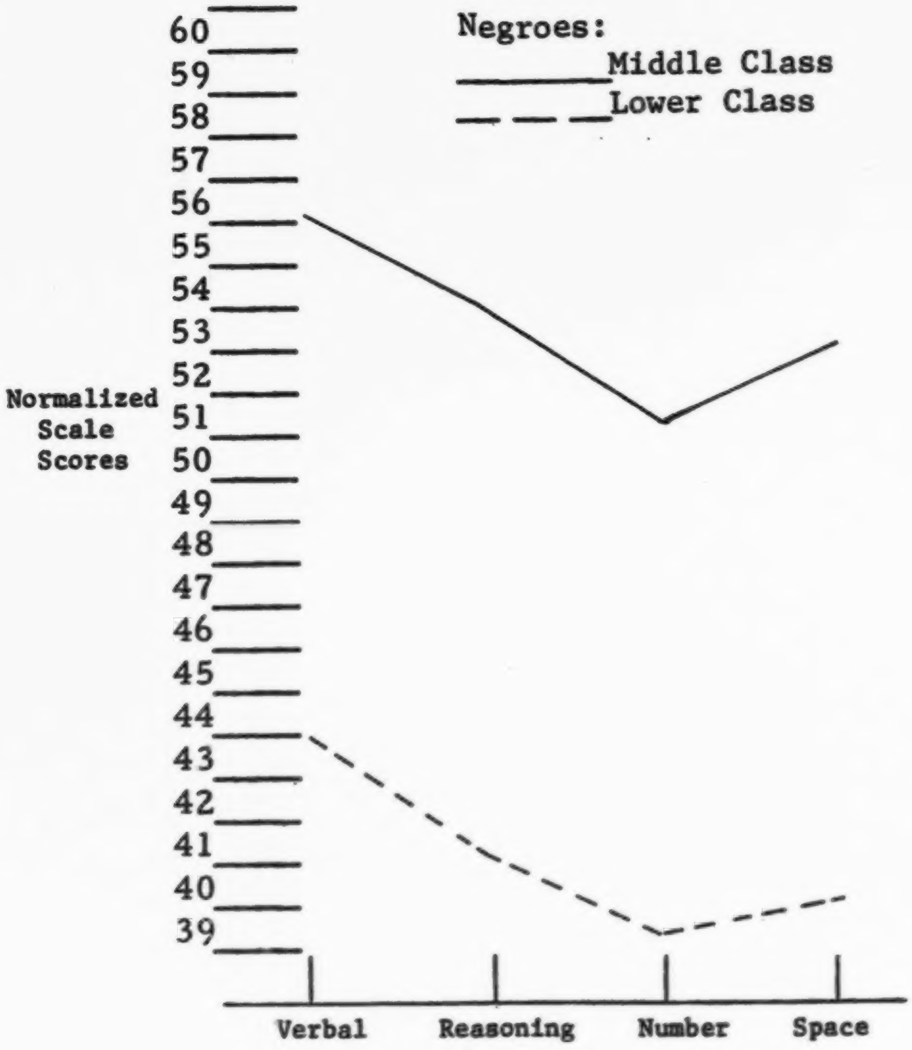


Figure 4.--Patterns of normalized mental-ability scores for middle- and lower-class Negro children.

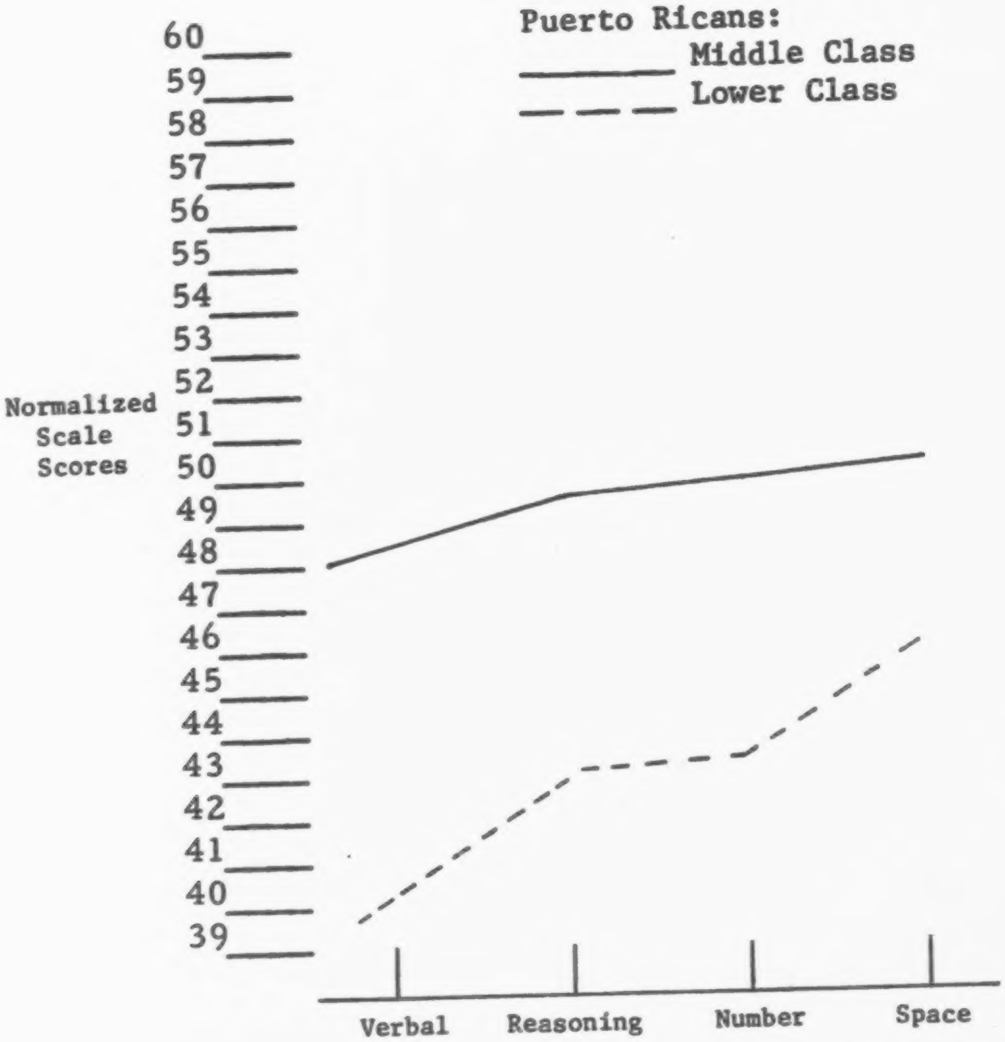


Figure 5.--Patterns of normalized mental-ability scores for middle- and lower-class Puerto Rican children.

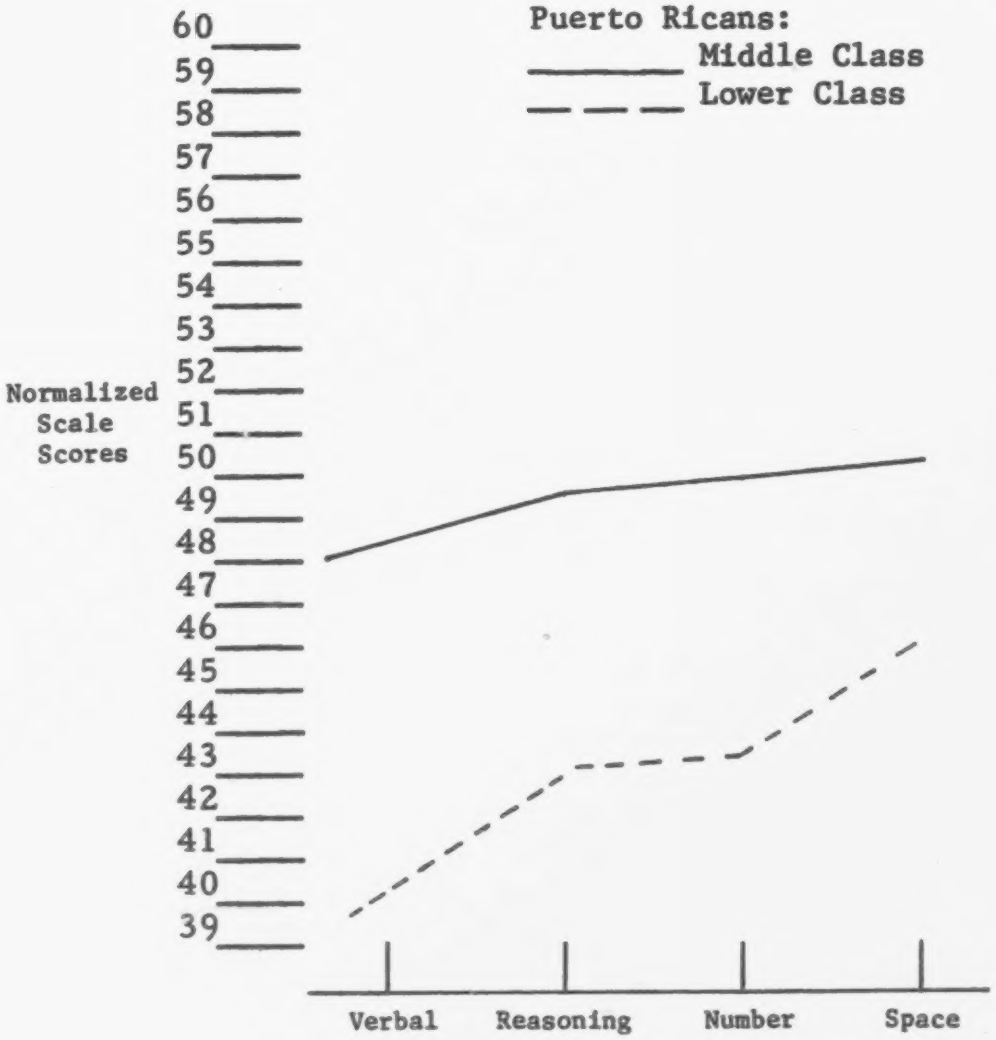


Figure 5.--Patterns of normalized mental-ability scores for middle- and lower-class Puerto Rican children.

b. Interactions between social-class ethnicity:

Table 1, summarizing our earlier findings, indicates significant interactions between social class and ethnicity on the level of each mental ability. Table 2 shows the mean level of each mental ability for Chinese and Negro children from each social-class group; the same interaction effects appear when Jewish and Puerto Rican children are included, but the present table has been reduced to the Chinese and Negro children to simplify the present discussion. Two effects combine to produce the interaction effect between social class and ethnicity:

a. On each mental-ability scale, social-class position produces more of a difference in the mental abilities of the Negro children than for the other groups. That is, the middle-class Negro children are more different in level of mental abilities from the lower-class Negroes than, for example, the middle-class Chinese are from the lower-class Chinese.

b. On each mental-ability scale, the scores of the middle-class children from the various ethnic groups resemble each other to a greater extent than do the scores of the lower-class children from the various ethnic groups. That is, the middle-class Chinese, Jewish, Negro, and Puerto Rican children are more alike in their mental ability scores than are the lower-class Chinese, Jewish, Negro, and Puerto Rican children.

TABLE 2

MEAN MENTAL-ABILITY SCORES FOR CHINESE AND NEGRO CHILDREN FOR EACH SOCIAL-CLASS GROUP

Verbal

	Chinese	Negro	
Middle	76.8	85.7	81.3
Lower	65.3	62.9	64.1
	71.1	74.3	72.7

Class and ethnicity, F=7.69 $p < .01$

Reasoning

	Chinese	Negro	
Middle	27.7	26.0	26.9
Lower	24.2	14.8	19.5
	25.9	20.4	23.2

Class and ethnicity, F=11.32, $p < .01$

Number

	Chinese	Negro	
Middle	30.0	24.7	27.4
Lower	26.2	12.1	19.2
	28.1	18.4	23.3

Class and ethnicity, F=8.91, $p < .01$

Space

	Chinese	Negro	
Middle	44.9	41.8	43.4
Lower	40.4	27.1	33.8
	42.7	34.4	38.6

Class and ethnicity, F=10.83, $p < .01$

Some earlier research (see Anastasi, 1958, Chapter 15) suggested that social-class influences upon intelligence are greater in white than in Negro groups. No distinct contrast with white children was available in our study, but the evidence indicates that social-class influences upon the mental abilities of Negro children are very great compared with the other ethnic groups represented. One explanation for the apparent contrast between the earlier and present findings is that the earlier research, perhaps, did not include middle- and lower-class Negro groups that were distinctively different. In any event, our findings show that the influence of social-class on the level of abilities is more powerful for the Negro group than for the other ethnic groups.

c. Group data vs. individual data:

The data analyses described to this point refer to differences in the performance of groups and not to the performance of individuals. These analyses do not indicate how an individual will perform, but they suggest how he is likely to perform, if he belongs to one of these eight groups. One technique we have used to proceed from group analyses to identifying particular patterns for individuals is called a "classification analysis" (see Table 3). This analysis allows the researcher to compare the pattern of mental-ability scores for each individual subject with the pattern profiles of his group and other groups. It yields data on the degree to which a subject's profile resembles the profile of his or the other groups (Tatsuoka, 1957). If mental-ability scores were not associated significantly with social-class and ethnicity, and hence a chance frequency of correct placement of individuals occurred, random cell assignment in

Table 3 would be approximately 5 cases per cell. Thus, if the 40 middle-class Chinese children showed no distinctive pattern of their own, they would be expected to be distributed equally among all eight group patterns. The deviation of the actual frequencies in the underlined diagonal cells from the chance frequency of five indicates the degree of correct classification beyond chance obtained through knowledge of the individual's mental-ability scores. Thus, 32 middle-class Jewish children and 28 lower-class Negro children fit their group patterns. In contrast, only three middle-class Puerto Rican children (two less than chance) were classified correctly. It is clear that the middle-class Puerto Rican children were the most heterogeneous of the eight groups. Overall, the number of cases classified correctly through knowledge of the mental-ability pattern surpassed chance classification at a probability value associated with thirty-six zeroes, i.e. the "p" value for correct classifications was less than one in ten to the thirty-fifth exponent. At this point the computer stops processing zeroes. In short, knowledge of the child's pattern of mental abilities allows the correct identification of his social-class and ethnic-group membership to a degree far exceeding chance expectations.

We note this analysis for two reasons. Methodologically, it provides a useful device for moving from group data to the analysis of the individual case. Substantively, it has allowed us to identify the children who fit closely the profile of their group and those who are exceptions in their group but resemble the profile of some other group. This capability allows us to pinpoint cases in exploring questions about the origins of patterns of mental ability and about the fitting of school practices to these patterns.

TABLE 3

Classification Analysis

Group N = 40, each Group	Group Patterns M Ch	L Ch	M J	L J	M N	L N	M PR	L PR
Middle Chinese	13*	10	6	1	5	1	2	2
Lower Chinese	6	14	2	4	3	1	1	9
Middle Jewish	4	0	32	4	0	0	0	0
Lower Jewish	0	1	9	18	7	4	0	1
Middle Negro	5	1	11	10	11	0	0	2
Lower Negro	1	3	0	3	0	28	0	5
Middle Puerto Rican	6	6	3	6	4	0	3	12
Lower Puerto Rican	0	7	1	1	0	8	3	20

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*Figures to be read across as follows: The scores of 13 middle-class Chinese subject fit the middle-class Chinese pattern and level on the four mental ability scales; 10 middle-class Chinese look more like lower-class Chinese; 6 look more like middle-class Jews, 1 more like a lower-class Jew, etc.

5. Some Conclusions:

The study demonstrated that several mental abilities are organized in ways that are determined culturally. Referring to social-class and ethnic groups, Anastasi (1958) proposed that "groups differ in their relative standing on different functions. Each ... fosters the development of a different pattern of abilities." Our data lend selective support to this position. Both social-class and ethnic groups do "differ in their relative standing on different functions," i.e., both social class and ethnicity affect the level of intellectual performance. However, only ethnicity "fosters the development of a different pattern of abilities," while social-class differences within the ethnic groups do not modify these basic patterns associated with ethnicity.

To look ahead to our discussion of defining and delimiting the term "disadvantaged:" if in our study we define the "disadvantaged" as belonging to a particular ethnic group, this has one set of consequences for the development of intellectual skills -- ethnic groups differ in both level and pattern of mental abilities. If we define the term using the social-class criteria of occupation, education, and neighborhood, the consequences are quite different -- social class affects level of ability, with middle class being uniformly superior, but does not alter the basic patterns of mental ability associated with ethnicity. Still other definitions -- for example, unavailability of English language models, the presence of a threatening and chaotic environment, matriarchal family structure, high family mobility, parental absence or apathy, poor nutrition -- probably generate still other consequences, although we really know very little empirically about these relationships.

B. A Replication Study[1]:

Since our early results were both surprising and striking in magnitude, our next step was to conduct a replication and extension with first-graders in Boston. The replication was conducted with middle-class and lower-class Chinese and Negro children (the samples of Jewish and Puerto Rican children who fit our social-class criteria were not available); the extension included another ethnic group -- children from middle- and lower-class Irish-Catholic families.

Once again, the results were both striking and surprising. The replication data on Chinese and Negro children in Boston duplicated almost exactly our earlier data on similar samples in New York City. The striking, almost identical test performances in the original and replication study is shown in Figures 6-10. The raw mean scores of the Chinese children in Boston and in New York were different by an average of one-third of one standard deviation (Figure 6), and the Negro children in Boston and in New York were one-fifth of one standard deviation different from each other (Figure 7). Only one mean difference (numerical scores of Boston and New York Chinese) slightly exceeded one-half of one standard deviation.

The resemblance of the original and replication samples in patterns of mental ability is shown in Figure 8 (which contrasts the ethnic groups in the two cities with middle- and lower-class samples combined), Figure 9 (which displays the Chinese patterns in Boston and New York for each social-class group), and Figure 10 (which displays the Negro patterns in Boston and New York for each social-class group). With very

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[1] This replication study was conducted under the direction of Dr. Jane Fort, Laboratory of Human Development, Harvard University.

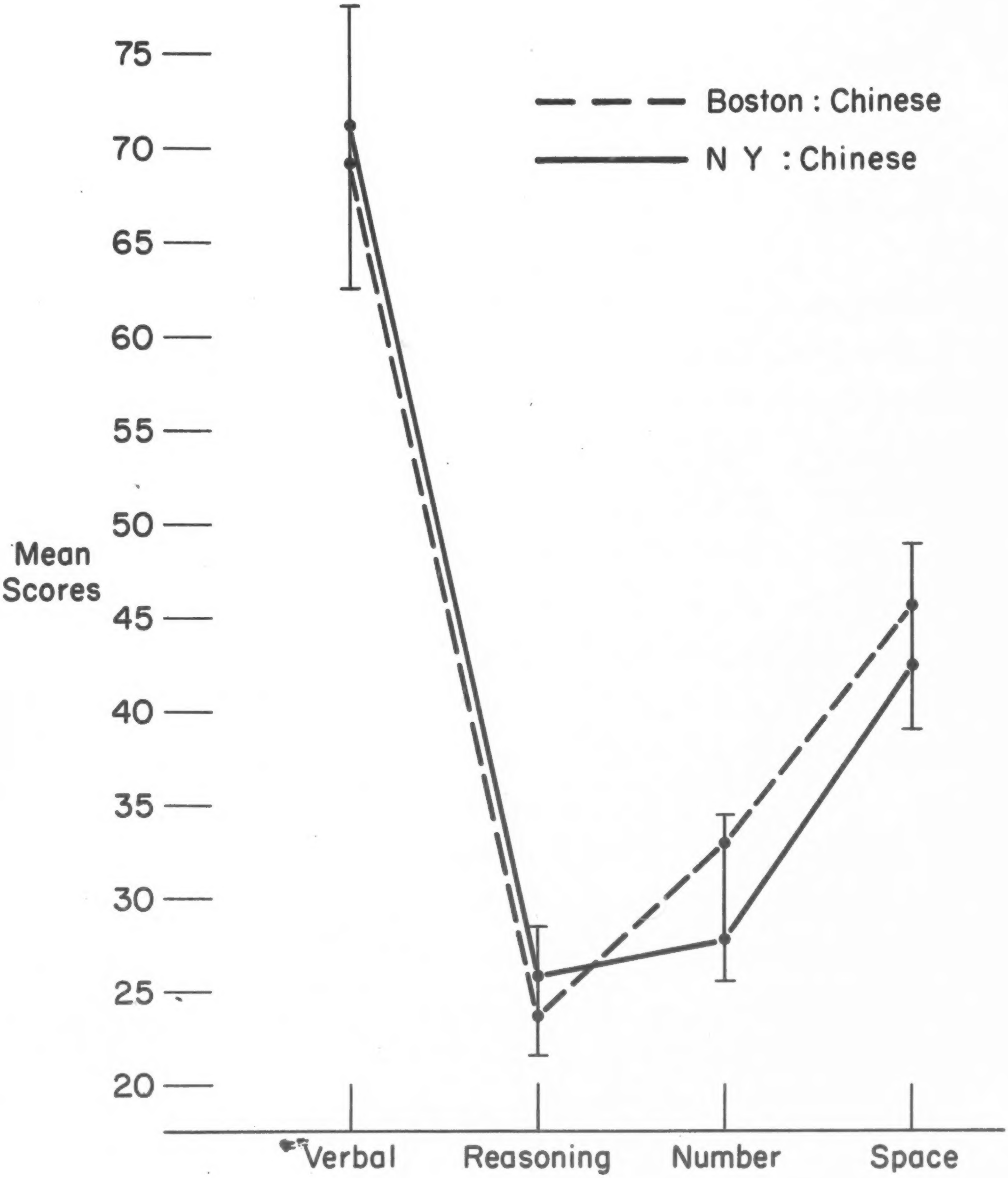

Figure 6. - Mean mental ability scores for Chinese children in Boston (N=20) and New York (N=80).

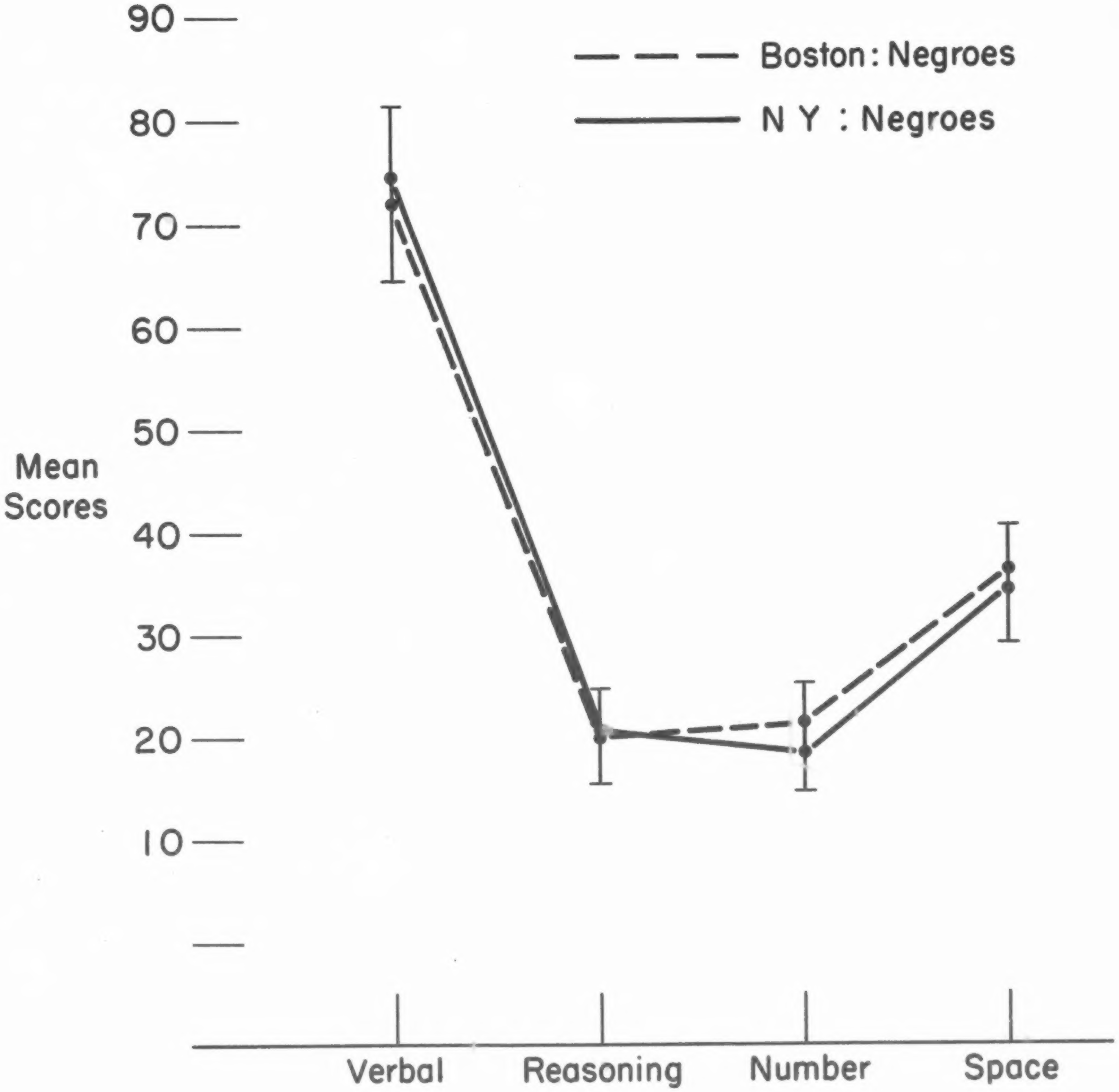

Figure 7. — Mean mental ability scores for Negro children in Boston (N=20) and New York (N=80).

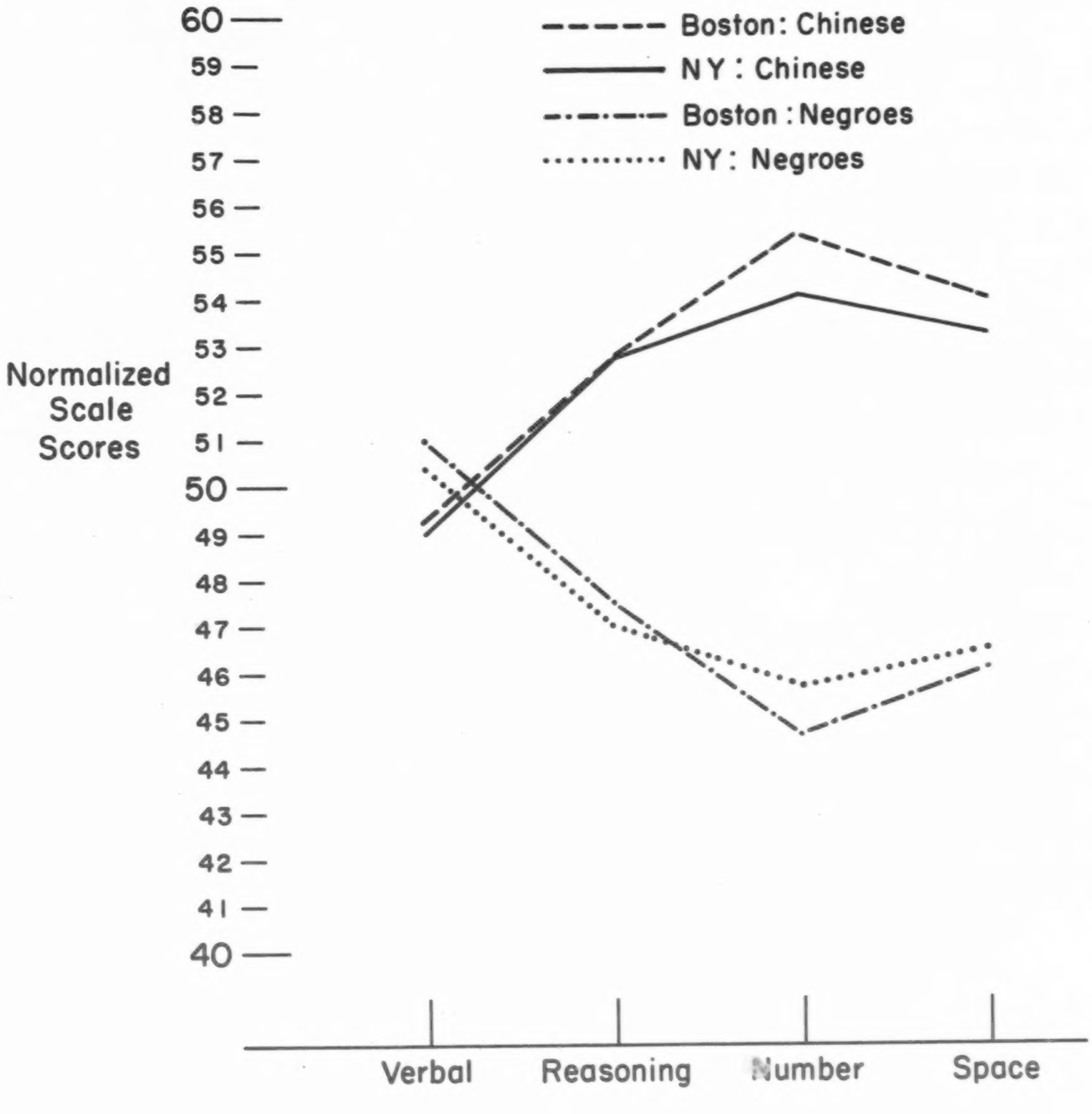

Figure 8.— Patterns of mental ability for Chinese and Negro children: NY vs. Boston.

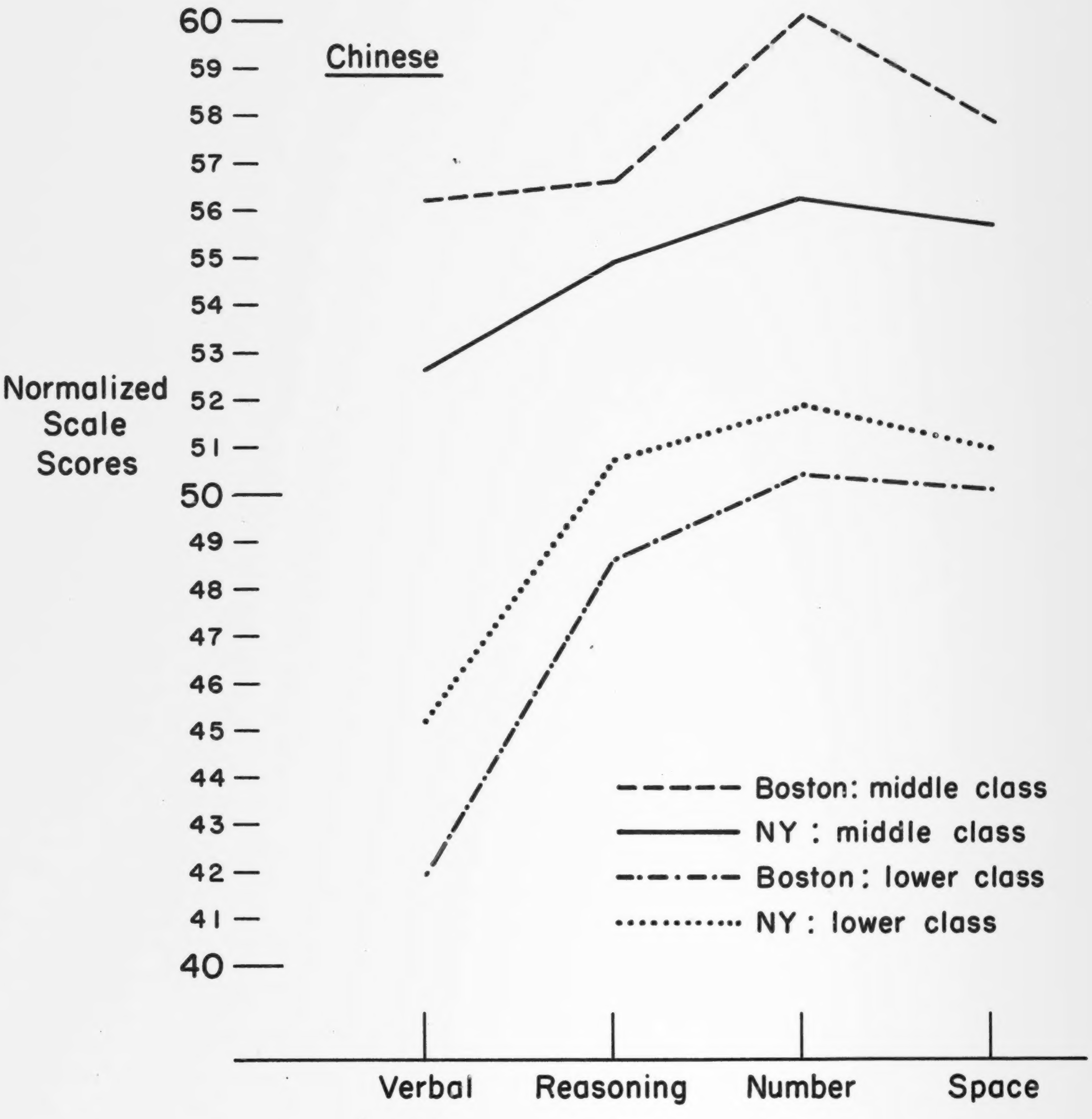

Figure 9. – Patterns of mental ability for Chinese children; middle-and lower-class, NY vs. Boston.

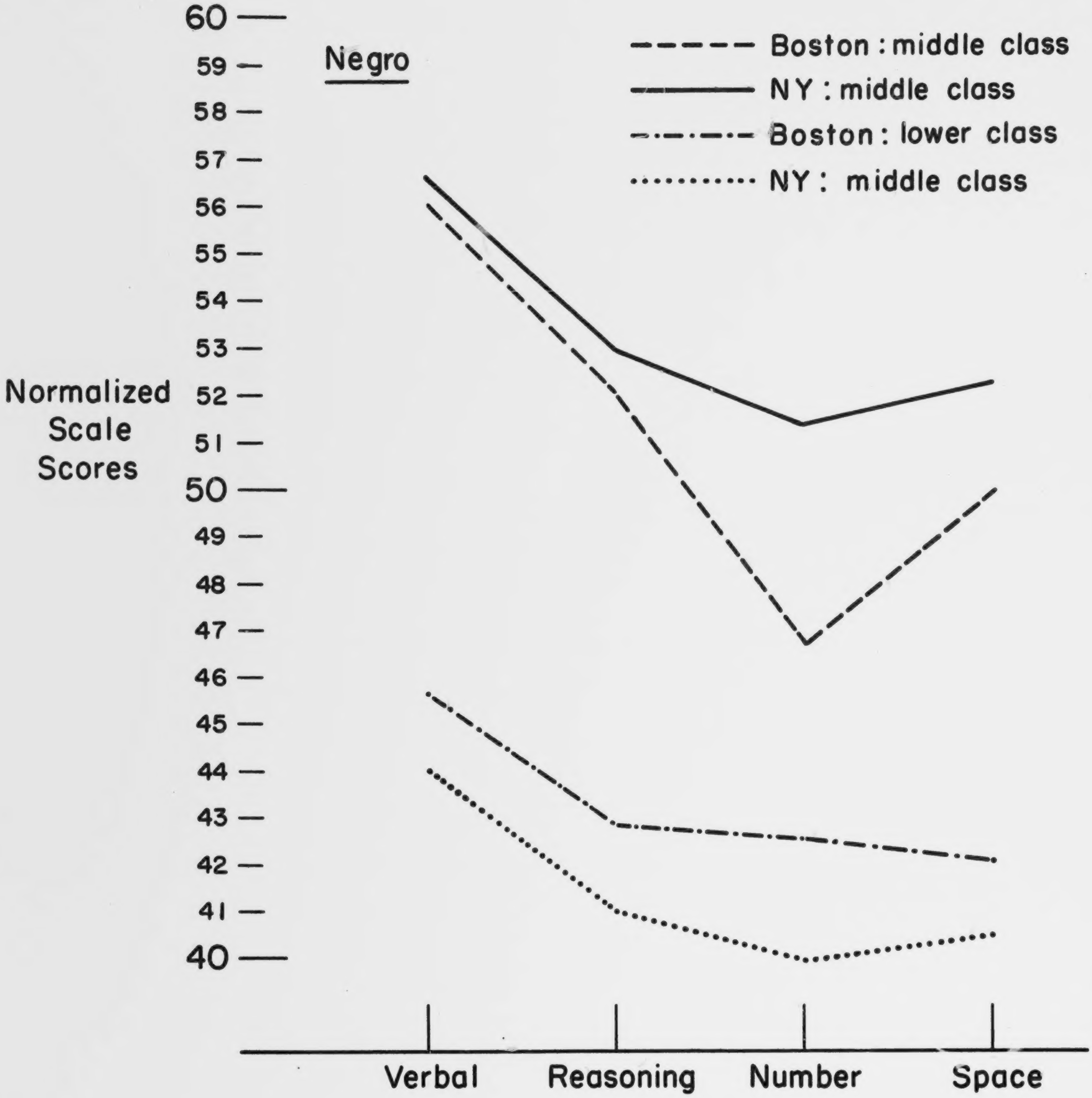

Figure 10.- Patterns of mental ability for Negro children; middle-and lower-class, NY *vs*. Boston.

few exceptions (number skills, especially multiplication and division, of the middle-class Chinese in Boston are slightly superior to the middle-class Chinese in New York), both the levels and patterns of mental ability in the Boston data almost duplicate the New York City data for Chinese and Negro children.

This replication study also included an ethnic group not previously studied in New York City: middle- and lower-class Irish-Catholic children. These first-grade Irish-Catholic children, however, in contrast to all the other ethnic groups tested, displayed neither a distinctive ethnic-group pattern or the similarity of patterns for middle- and lower-class segments of the Irish-Catholic sample. Although we have no definitive explanation of this finding as yet, the absence of a distinctive ethnic-group pattern seems related to our failure to locate homogeneous concentrations of middle- and lower-class Irish-Catholic families in Boston. The Irish-Catholic families are less confined to limited geographic areas than the other ethnic groups and are more diffused throughout the city. We could not locate either middle- or lower-class Irish-Catholic families who fit clearly the occupational, educational, and neighborhood criteria for social-class placement. In short, there are at least two plausible explanations for the failure to replicate our results on other ethnic groups with the Irish-Catholic children: poor sampling of middle-class and lower-class Irish-Catholic families (due to their unexpected unavailability in Boston) or a real difference between Irish-Catholic children and those from other ethnic groups. We are pursuing this issue.

In the report of our original study, we noted an interaction effect between social class and ethnicity in which the social-class difference produces more of a difference in the mental abilities of the Negro children than for the other ethnic groups. In the replication study, this finding reappeared: the middle-class Negro children are more different in level of mental abilities from the lower-class Negro children than the middle-class Chinese or Irish-Catholic children are from lower-class Chinese or Irish-Catholic children. It was also true in the replication,as in the original data, that the scores of the middle-class children from the various ethnic groups resembled each other more than the scores of the lower-class children from these ethnic groups. That is, the Chinese, Irish-Catholic, and Negro children are more alike in their mental ability score (with the one exception of the middle-class Chinese in numerical ability) than are the lower-class Chinese, Irish-Catholic, and Negro children.

One further specific analysis should be noted before proceeding to a discussion of future research and the implications for educational policy. Now that five ethnic groups have been tested, we assessed their relative contribution to the distinctiveness of ethnic-group patterning. The percentage of total ethnicity variance contributed by each ethnic group was as follows:

Table 4

Percentage of Variance Contributed by Each Ethnic Group to the Groups x Tests Interaction Term

Ethnic Group	% of Variance
Chinese	39
Irish-Catholic	1
Jewish	38
Negro	13
Puerto Rican	9

While the groups differ markedly in their relative contributions to the distinctiveness of ethnic-group patterns, all (except for the Irish-Catholic) contribute to a statistically significant degree.

The results of several recent studies are compatible with these findings. For example, Coleman's (1966) study of Equality of Educational Opportunity included first-grade (as well as third, sixth, ninth, and twelfth grade) children from Oriental American, Negro, Puerto Rican, Mexican American, Indian American, and white groups. This study does not include all our mental-ability variables nor does it provide a good assessment of social-class for the younger children, but Coleman's data for Chinese, Negro, and Puerto Rican children on Verbal and Reasoning tests show patterns very similar to ours.

We do have some confidence, then, in our earlier findings on the effects of social-class and ethnic-group influence on the development of patterns of mental abilities in young children: at least several mental abilities are organized in ways that are determined culturally, social class producing differences in the level of mental abilities (the middle class being higher) and ethnic groups producing differences in both level and pattern of mental abilities.

C. Future Research:

To pursue the educational relevance of these findings, we are now studying the following questions:

1. What actual school behaviors are predicted by the patterns of mental ability?

2. Are the differential patterns related to ethnic-group differences stable over time or do intervening experiences modify them?
3. What are the specific origins or antecedents of differential patterns of mental ability?
4. How can our knowledge about patterns of mental ability be fitted to the content and timing of instruction?

1. Mental-Ability Patterns as Predictors of School Achievement:

Mrs. Stodolsky has stressed the importance of examining a variety of criteria related to school achievement in research on the "disadvantaged." We are assessing the predictive value of our mental-ability data for forecasting various patterns of school achievement, asking these questions: is there an optimal pattern of mental abilities that results in superior school performance or are different optimal patterns associated with superior school performance in different subject-matter areas? If optimal patterns are identified, can the child's abilities be reinforced differentially so that these optimal patterns are produced or should the educational program adjust itself to the relative strengths and weaknesses of the child?

Convincing laboratory demonstrations (e.g., Duncanson, 1966) exist of the interrelations between measures of abilities and performance on several learning tasks. Using our mental-ability measures as predictors, we are attempting to extend these analyses to classroom learning performance.

In the research effort on matching instructional strategies and patterns of abilities, which we shall describe in a moment, we go more deeply into the relationship between types of intelligence and school performance. The achievement test measures used in our predictive validity study are static criteria of school performance; what really interests us is the predictive value of the mental-ability measures in forecasting learning in response to variations in instructional strategies. However, the relationships between mental-ability patterns and achievement test measures do provide some assessment of the predictive validity of the mental-ability patterns.

2. Stability over Time of Mental-Ability Patterns:

Will the major finding of this study, that differential patterns of ability are related to ethnic-group differences, remain stable across age groups? That is, does ethnic-group membership continue to determine the pattern of abilities for children with increasing maturity? Do the relative strengths and weaknesses of the subjects represent different rates of learning that eventually level off to a more or less common mean for all groups, or do they indeed represent stable cognitive organizations? What is the role of school experience in modifying distinctive ethnic-group patterns? That is, do the different patterns of mental ability persist in spite of the possible homogenizing effects of schooling through the heavy emphasis on verbal forms of instruction and the de-emphasis on the use of other intellectual skills?

To answer these questions, we have recently completed the construction of an upward extension of the tests of mental ability, providing appropriate measuring instruments for fifth- through eighth-grade children. Since our original New York City sample will be entering sixth-grade and we have located about 85% of them, we will attempt to assess the size and magnitude of changes in mental-ability patterns over a five-year period.

There are few empirical precedents here. Studies of the differentiation of mental ability have not traced the course of social-class and ethnic influences through the use of samples followed longitudinally. Evidence on ethnic-group variations on samples of older subjects is conflicting -- Stewart, Dole, and Harris (1967) do not find variations in the factorial structures of different ethnic groups, but Guthrie (1963) does. Cross-sectional findings (e.g., Meyers, Dingman, and Orpet, 1964) show stability in factorial structure across three age groups (2, 4, and 6-year-olds). But no direct evidence tells us whether there are ethnically-distinctive patterns of mental ability which persist, dissolve, or change with age.

3. Developmental Origins: Antecedents of Diverse Mental Abilities:

What early experiences produce the particular patterns of mental ability in different ethnic groups? Many different environmental influences may be operating: the reinforcements the parents offer for different types of intellectual performance, opportunities inside and outside the home for learning different skills, the value placed on different forms of intellectual performance, the parents' intellectual aspirations for the child, work habits developed in the home, and so forth. Some suggestions exist in the literature (e.g., Bing, 1963) that less direct child-rearing influences -- for example the fostering of dependence or independence or the presence of a tense parent-child relationship -- affect the development of mental abilities differentially.

We are now setting out to investigate the variations among ethnic groups in the history of differential experience in learning different mental skills. We assume that different emphases exist among ethnic groups in the specific intellectual functions that are stimulated and encouraged and these different emphases are reflected in their different organizations of mental abilities. This research demands a longitudinal analysis which begins very early in the child's life as well as naturalistic observation in and out of the home. Since the little empirical research on the history of differential mental abilities is essentially retrospective in design, extensive methodological development is demanded by this research.

4. School-Based Research: Matching Instructional Strategies to Patterns of Mental-Ability:

How can knowledge of a child's pattern of mental abilities be fitted to the content and timing of his instruction? How can instruction be adjusted to the particular strengths and weaknesses in the child's intelligence, or the child's intellectual abilities modified to meet the demands of instruction? In the context of individualizing instruction, we are attempting to fit instruction to particular forms of intelligence and *vice versa*. In the context of research design, we are searching for the interactions between instructional treatments and the abilities of the learner in order to determine how selected mental-ability variables are differentially related to learner performance under different treatments or conditions of instruction.

Answering these questions requires continuous, successive approximations to an analysis of the child's special combination of intellectual resources and the demands for intellectual resources placed upon him by the curriculum. We have begun two preliminary studies, one in the teaching of beginning reading, another in learning the concept of mathematical functions at the sixth-grade level. One approach we have used begins with an assessment of the child's particular pattern of mental ability and seeks to build an instructional strategy to capitalize on the child's intellectual strengths and minimize his weaknesses. For example, in teaching mathematical functions to children strong in Space Conceptualization but weak in Numerical facility, we use graphical presentation; in teaching the same concept to a child strong in Number facility but weak in Space Conceptualization, we rely on the manipulation of numbers in a tabular form. Using this approach, a correct matching of child and curriculum (e.g., a spatial child given a spatially-oriented curriculum) results in some learning for all children; however, there is wide variation in amounts of gain within the correctly-matched group. Incorrect matching (e.g., a numerical child given a spatially-oriented curriculum) results uniformly in insignificant gain. That is, at this point we seem to be able to create destructive mismatches more successfully than constructive matches. Practically, this is not much of a gain -- in our roles as teachers we have been creating mismatches for years. Conceptually, however, we are discovering the forms that the matching and mismatching of intelligence and curriculum can take. We consider this research a useful first approximation to the iterative process of matching curriculum and individual differences. We now have identified one set of necessary conditions for fitting instruction and individual differences: to learn a space-oriented curriculum, the child must possess (or be taught first) a specifiable minimum skill in space conceptualization. How far and how rapidly he progresses in responding further to the space-oriented curriculum is not explained by his initial status. It is therefore necessary to extend our assessment to other relevant attributes of the child and thereby extend the iterative process of matching curriculum and individual differences in intelligence.

Another approach to intelligence-curriculum matching starts with a task analysis of the intellectual demands imposed by a curriculum and proceeds to an analysis of the intellectual skills available to the child with the purpose of modifying or developing these skills to the requisite levels necessary to the task. Our only attack on this approach to date is some preliminary analysis of the modifiability of mental-ability variables. Some earlier work by Thelma Thurstone and more recent work at Educational Testing Service for first-graders in New York City and by Julian Stanley at Wisconsin hold promise that mental abilities can be modified to match the demands of the curriculum.

It is clear that knowledge of four mental abilities is insufficient to the task of matching individual differences in intelligence to the demands of complex curricula. It is also clear that we have few tools available for the adequate task analysis of different instructional strategies. Additional preliminary research is attempting to expand our conceptualization based on mental abilities by categorizing both the intellectual skills and the curriculum demands by means of three-dimensional models of intelligence, such as Guilford's (1959) scheme which includes not only mental operations (related to mental abilities) but contents and products as well, or Jensen's (1967) model which includes not only modality variables (related to mental abilities) but types of learning and procedures for presenting learning materials.

Thus, we are applying our analysis of patterns of mental ability to an issue which we believe has promise for classroom learning and teaching -- how to match instructional strategies and individual differences in intelligence to produce effective learning performance.

D. Implications for Educational Policy:

1. Coleman's Argument in "Equality of Educational Opportunity:" Equal Opportunity for Equal Development:

We mentioned earlier the recent study on Equality of Educational Opportunity directed by James S. Coleman (1966). The results and particularly the interpretation of this study provide a useful point of departure for analyzing the implications for educational policy of the data described here on ethnic-group and social-class differences in mental-ability patterns.

Coleman failed to find what he expected to find: direct evidence of unequal educational facilities in schools attended by children from different majority or minority groups. The study set out to document the fact that, for children of minority groups, school facilities are sharply unequal and this inequality is related to student achievement. The data did not support either conclusion. Instead, Coleman reports only small differences in school facilities, teacher experience and competence, and other direct indices of the quality of education, and -- anyway -- what differences did exist had little or no discernible relationship to the level of student achievement.

Starting with these facts, Coleman develops an argument which we shall contrast with the implications of the mental-ability study. Schools are still demonstrably unequal, he says, because Negro and white students do not display equal levels of educational achievement when they complete high school. _Ipso facto_, the schools are unequal, despite the absence of direct evidence of such inequality.

Coleman's argument starts with the premise that the proper function of the schools in a democracy is to produce equal achievement levels among different groups in our society. Arguing from this premise, the demonstrated fact that Negroes and whites are unequal in level of educational attainment testifies to the inequality of educational opportunities provided by the schools. That is, by definition, schools are designed to make groups equal. They do not do so. Therefore, schools are unequal in the educational opportunities they provide. Indeed, following this argument, the single decisive criterion for judging equal educational opportunity is that all groups be equal in school performance.

Coleman makes his position clear by saying that the role of the schools is to "...make achievement independent of background." This position is shared by much research on the "disadvantaged," where the objective is to seek means to reduce the discrepancy in achievement levels between "deprived" and "non-deprived" children.[1]

2. The "Equal Footing" Basis of Coleman's Argument:

At one level -- the "equal footing" level -- Coleman's line of reasoning seems to epitomize logic, common sense, and compassion. It seems to ask only that we give children from "disadvantaged" backgrounds a fair shake -- that through the educational system we educate all children to a point of equality in school achievement so that all groups can compete on equal terms for jobs or future educational opportunities.

However, it is our contention that Coleman's analysis does not go far enough, does not tell the whole story or consider all the evidence, and therefore is misleading and perhaps destructive. It fails to consider either the role of diversity and pluralism in our society or several alternative definitions of the function of schooling. Should schools provide equal opportunities to promote the equal development of all groups and individuals or equal opportunities for the maximum development of each group or individual? Can schools aim to do both?

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[1] The counterpart to Coleman's reasoning about equal educational opportunity exists in the history of "culture-free" test construction, another topic of great relevance to the education of the disadvantaged. Early developers of "culture-free" tests (e.g., Eells et al.,1951) argued that only tests which extracted items distinguishing among groups were free of "bias." The parallel to Coleman's argument is apparent: (1) the proper function of a "culture-free test is to produce equal test scores for different social-class and ethnic groups, (2) if equal scores are not obtained, the fault is that the test (or some kinds of test items) produce the difference. Difference in test scores, ergo, bias in test items. The logical fallacy of this argument is now well-documented (e.g., Anastasi, 1958; Lorge, 1952), but the simple and surface persuasiveness of the argument stalled progress for many years in the study of cultural influences upon intelligence.

3. An Alternative Argument: Equal Opportunity for Maximum Development:

We believe that our data on patterns of mental ability clarify these two alternative and perhaps complementary assumptions regarding the function of education: (1) to provide equal opportunity for equal development, or (2) to provide equal opportunity for maximum development of each group or individual, whether or not group differences remain, enlarge, or disappear as a consequence. These positions are apparently incompatible but need closer examination in the light of empirical evidence.

a. Data on Social class:

From our mental-ability data, what would we predict would happen if we modified the social-class characteristics of all our lower-class families -- elevating the jobs, educations, and housing of the lower-class families in all ethnic groups? Within each ethnic group, we would expect to elevate the mental abilities of the lower-class children to resemble those of the middle-class children in that ethnic group, making them more similar to their middle-class counterparts in that ethnic group in level of ability. In this sense, we would be making groups of children more similar, removing the differences in mental ability associated with differences in social-class position.[2]

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[2] We noted earlier (p. 39) that social-class position produces more of a difference in the mental abilities of Negro children than for the other groups. From this finding, it is possible to speculate that elevating the social-class characteristics of lower-class Negro families would produce a more dramatic increase in the level of the Negro children's abilities than would a comparable change in social-class position affect the children from other ethnic groups.

If we elevated the social-class position of our lower-class families we might produce still another effect which increases the similarity among groups. You will recall that we described an interaction effect between social class and ethnicity in affecting the level of each mental ability, this interaction effect showing that the mental-ability scores of middle-class children from various ethnic groups resembled each other more than the scores of the lower-class children from these ethnic groups. This interaction can be described as a convergence effect, in which the scores of the middle-class children across ethnic groups converge to a greater extent than the scores of lower-class children.

Thus, by elevating the occupations, educations, and neighborhoods of our lower-class families, our data would lead us to expect an increased resemblance of mental-ability levels for children within each ethnic group and, in addition, a convergence of scores of children across ethnic groups.

b. Data on ethnic groups:

To this juncture, our analysis supports the argument for equal educational opportunities for equal development: our data on level of mental ability suggest that elevating social-class characteristics of lower-class families would contribute to a greater degree of equality of development in level of intellectual functioning. Now, what of the alternative conception that the proper function of education is to provide equal opportunity for maximum development no matter what the consequences for the absolute magnitude of group differences? Recall the data on patterns of intellectual functioning indicating that once the mental-ability pattern specific to the ethnic group emerges, social-class variations within the ethnic group do not alter the basic organization associated with ethnicity. This finding suggests that lower-class children whose social-class position is elevated would still retain the distinctive mental-ability pattern associated with their ethnic group. The implication is that no matter what manipulations are undertaken to modify the social-class positions of children within an ethnic group, the distinctive ethnic-group pattern of abilities will remain.

From this set of observations, the question then arises: how can we make maximum educational use of the distinctive patterns of ability the child possesses? We do not have definitive answers to this question, and it forces us to consider the line of future research discussed earlier on matching instructional strategies to the patterns of mental ability (pp. 24 & 50). But assuming we can find some empirical answers to the problems of adapting curriculum to individual differences and *vice versa*, we must accept the inevitable consequence of arranging to capitalize maximally on distinctive patterns of ability: that, in certain areas of intellectual accomplishment, we may not reduce or bring toward equality the differences among various groups but we may actually magnify those differences.

Let us take a specific, if partially hypothetical, case to clarify the "maximum education" and "equal education" arguments. Our evidence indicates (see Figure 1) that young Chinese children have their strongest skill in Space Conceptualization and their weakest in Verbal ability. Conversely, young Jewish children are strongest in Verbal and weakest in Space. Following our principle that maximum matching of instruction and ability for the Chinese children, we may produce proportionally many more Chinese than Jewish architects and engineers -- the Chinese children really bring stronger Space skills to be maximized through instruction than do the Jewish children, and if each group receives maximum training, the Chinese children will surpass the Jewish children in skills basic to architecture and engineering. Conversely, for Jewish children we may through maximum matching of instruction and abilities, produce proportionally many more Jewish than Chinese authors and lawyers. We will not have produced proportionally equal numbers of Chinese and Jews entering these different professions; we will not have put members of these two ethnic groups on an "equal footing" for entering a particular occupation. But can we say that we have produced a socially-destructive outcome by starting with the knowledge of differences in ability patterns and adapting our instructional strategies to this knowledge to produce a maximum match for each child, even if this process results in inequality of certain educational and professional attainments?[3]

4. An Interim Summary:

We challenged Coleman's "equal footing" argument by saying that it did not tell the whole story or use all known data. Some of these data, mainly the effects of social class upon level of mental ability, testify in favor of the argument for equal educational opportunity for equal development. Other data, namely the effects of ethnicity upon patterns of mental ability, testify to the importance of providing equal educational opportunities for the maximum development of groups and individuals, even if inequality of groups occurs as a consequence. Are these arguments contradictory or supplementary? We shall address this final question after we pursue its implications for the definition of the label "disadvantaged."

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[3] At an earlier point in the argument, we referred to the related topic of the development of "culture-free" tests. At this point in the argument, the counterpart topic is that of the difference between "compensatory" and "supportive" educational programs for "disadvantaged." "Compensatory" programs aim to compensate, to make amends, to eradicate symptoms and causes -- to give disadvantaged children what they need to make them like everyone else. In contrast, the aim of what might be termed "supportive" education is to give disadvantaged children what they need and can use maximally in order to learn to cope with and change their particular environments, even if they are made more different from everyone else in the process.

5. Implications for the Definition of "Disadvantaged:"

Let us start with the simplest possible definition of "disadvantaged," i.e., the "not advantaged." Given this definition, one might argue that the "advantaged" have something (or many things) that the "disadvantaged" do not have, that these "have not's" should be given what the "have's" already possess, and then we shall all be equal. Certainly, matters are not that simple.

Defining the "disadvantaged" in terms of differences in social-class position adds some precision to the definition of "not advantaged." It identifies more clearly some of the characteristics on which the "have's" and the "have not's" differ: jobs, education, housing. A social-class definition thus specifies three dimensions of the limited social boundaries within which the lower-class child may move. However, the empirical implications of the social-class definition are not very different in substance from the definition of "not advantaged." We have argued from our data that providing a lower-class family with what a middle-class family has -- better jobs, education, and housing -- will produce levels of mental ability resembling those of middle-class children. We thus provide equal education and social opportunities for equal development.

What happens, however, when we introduce ethnicity into our definition of "disadvantaged?" The consequences now change. It is no longer possible to follow the strategy of giving the "have not's" what "have's" possess; changing ethnic membership cannot be accomplished through social decree of federal action programs. We know ethnic groups differ in patterns of ability no matter what the social-class level within the ethnic group, and our educational problem now becomes that of providing equal educational opportunity to all ethnic groups to maximize their development, even at the expense of magnifying differences among the groups.

The point for defining the term "disadvantaged" is clear. The many different meanings assigned to this label may have accumulated arbitrarily according to the idiosyncratic choices of the various users of the term. But it is not merely a matter of whose definition sounds most convincing, or elegant, or compassionate. Each definition brings different empirical results and suggests different implications for educational policy and social action. We cannot afford this confusion; we are forced to be clearer about our definitions and their educational and social consequences.

6. A Final Summary:

Are equalization and diversification necessarily incompatible goals? We do not believe so. If accelerating the feasible gains in jobs, education, and housing of lower-class families accelerates the gains in intellectual development of their children and reduces the difference in intellectual performance between social-class groups, we can all agree on the desirability of this outcome. On the other hand, if recognizing the particular patterns of intellectual strengths and weaknesses of various ethnic groups and maximizing the potential power of these patterns by matching instructional conditions to them makes the intellectual accomplishments of different ethnic groups more diverse, we can all accept this gain in pluralism within our society. Thus, if lower-class children now perform intellectually more poorly than middle-class children -- and it is clear that they do -- and lower-class status can be diluted or removed by a society truly dedicated to doing so, this gain in equalization seems one legitimate aim of education. If the maximum educational promotion of particular patterns of ability accentuates the diverse contributions of different ethnic groups, this gain in pluralism seems another legitimate aim of education.

Perhaps this asks no more than to change what is bad and changeable in education and society (resulting perhaps in greater equalization) and to use maximally what is good in education and society (resulting perhaps in increased diversity). Logic, and the empirical evidence, endorses both conclusions.

IV. Toward a New Definition of the Disadvantaged.

We began this paper by accepting the common definition of disadvantaged status based on gross environmental characteristics: social class and ethnicity. This definition of disadvantage is strictly environmental and pre-assigned, ignoring child characteristics completely. It is a gross classification of children according to group membership only and what we can learn about children using this definition is usually expressed in terms of group tendencies (although we have suggested some techniques for moving from group data to individual analysis). Our suggestions for future research, both of developmental origins and school-based studies, direct us to some necessary refinements and extensions of these gross classifications.

Our recommendations for studies of developmental origins or environmental process analyses move us strongly in the direction of more precision and detail about environmental circumstances. Developmental research demands that a new definition of disadvantaged status be based on a much more refined assessment of environmental circumstances. Such an assessment would proceed far beyond the group characteristics we have dealt with in the past, specifying environmental circumstances which are closely articulated with developmental processes and which vary considerably within and across social-class and ethnic lines. Particular clusterings of environmental circumstances known to be related to developmental processes would lead to identification of disadvantaged status in more complex but precise terms.

Our discussions of school-based research suggest that the disadvantaged status be expanded to include characteristics of the child. We refer now to assessments of children which are intimately connected with instructional objectives and procedures. From this point of view, a multiplicity of child attributes would have to be used to assess readiness for learning a variety of school tasks. Such measurements of readiness would give much power and operational substance to the concept of disadvantage.

We are therefore suggesting that an important advance in definition could be made by joining more precise descriptions of environments with instructionally-based assessments of child characteristics. Beginning with environmental characteristics and then assessing children's learning patterns would lead to one grouping of those we would class as disadvantaged; the other direction of attack, starting with child characteristics and then assessing environments, would lead to another grouping. The usefulness and desirability of each direction of approach must await both empirical and practical assessment. In either case, the lesson is clear: a new definition of disadvantaged should include psychologically-meaningful statements about the environment and the child. The complexity of such statements will reflect a plethora of constructs and if-then statements about child-environment interactions but will be a realistic reflection of the diversity and individuality of children and the lives they lead.

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